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A HISTORY
OF THE
VARIOLOUS EPIDEMIC,

WHICH OCCURRED IN NORWICH

IN THE YEAR 1819, AND DESTROYED 530 INDIVIDUALS,
WITH AN ESTIMATE OF THE PROTECTION

afforded by

VACCINATION,

AND A REVIEW OF PAST AND PRESENT OPINIONS UPON

CHICKEN-POX

AND

MODIFIED SMALL-POX.

BY JOHN CROSS,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS
IN LONDON, CORRESPONDING MEMBER OF THE SOCIÉTÉ MÉDICALE
D'ÉMULATION OF PARIS, LATE DEMONSTRATOR OF ANATOMY
IN THE UNIVERSITY OF DUBLIN, &c.

LONDON:

PRINTED FOR BURGESS AND HILL, 55 GREAT WIND-MILL STREET;
ADAM BLACK, EDINBURGH; HODGES AND M'ARTHUR, DUBLIN;
AND WILKIN AND YOUNGMAN, NORWICH.

1820

Wilkin & Youngman, Printers.

Printed by Wilkin and Youngman,
Market Place, Norwich.

To

THOMAS BAYLY, ESQ.

SURGEON.

DEAR SIR,

From you I first imbibed habits of industry and a love for my Profession. To you I therefore take the liberty of dedicating this Treatise upon Subjects which you have ever regarded with the warmest feelings of humanity.

May you long continue to possess the vivacity of youth in your old age, and live beloved in the bosom of your Family.

Your Son-in-law,

JOHN CROSS.

P R E F A C E.

THE period which has elapsed since the introduction of Vaccination has created many fresh topics of inquiry. After more than twenty years' trial of the practice, we have to examine what has happened in regard to the means by which it has been promoted, the number of individuals who have submitted to it, the protection really afforded, and the effects produced on the mortality from small-pox.

In respect to some of these subjects, it is possible that a few advantages may have arisen out of my very limited situation, which has enabled me to give, from my

own observation, an account of a greater part of the whole effects of a destructive variolous epidemic, than could have been furnished by an individual placed in a large metropolis. Did not this excuse occur to me, I should probably not venture to write upon a question, which has recently met with attention from men placed in the most eminent situations.

The facts which I have stated are contained mostly in the first part of the treatise, and for those I pledge myself. The arguments into which I have been led will chiefly be found in the second part, and if these should be objected to, or even refuted, I shall not be extremely mortified, as I have offered them (so far as I can judge of my own feelings) without prejudice or presumption, rather waiting the decision of others, when more evidence shall have been collected, than presuming to have uniformly established incontrovertible deductions of my own.

My warmest thanks are due to my professsional Brethren in Norwich, whose

liberality has so much extended my opportunities of gaining information. To those Gentlemen in the County of Norfolk and Suffolk, in several other parts of Great Britain, and on the Continent, who have favoured me with their correspondence and assistance, I am equally indebted. And I shall be amply compensated for the little time and exertion I have bestowed upon the following pages, should the Medical Profession in general not deem them altogether useless and superfluous.

NORWICH,
MAY 14, 1820.

*Lately published by the same Author, and to be had of
all Booksellers,—price 8s.*

SKETCHES OF THE
Medical Schools of Paris,

Including remarks on the Hospital-practice, Lectures,
Anatomical Schools and Museums, and exhibiting the state
of medical Instruction in the French Metropolis, &c.

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PART THE FIRST.

A

HISTORY

OF THE

VARIOLOUS EPIDEMIC.

CHAPTER I.

Of the Small-pox.

NORWICH has long been celebrated for the salubrity of its atmosphere, and the great age to which a considerable proportion of its Inhabitants have attained. Its buildings are spread over an extensive surface of ground—its population is generally characterized by cleanliness and industry—and hence the serious forms of fever, which commonly occur in large towns, are here very rarely met with, the annual mortality being chiefly occasioned by such disorders as prevail equally in the country and the metropolis. If an exception can be made to

B

this observation, it must regard the small-pox, a disease that makes victims wherever it appears, but exists most often, and destroys most rapidly, in a populous city.

One effect of Variolous Inoculation. Whilst it was the custom for the higher and middling classes of society to seek protection by variolous inoculation, the disease in its natural and destructive form, was almost constantly kept up amongst the lowest orders, and the regular sacrifice of human life, which it occasioned, was very little regarded, or only held in the light of an unavoidable evil. The introduction of vaccination, by which the individual protects himself without endangering his neighbour, has given a new feature to the small-pox, keeping it entirely absent for a time, and allowing it to prevail, on its recurrence, to a greater extent, in consequence of the regularly encreasing number of those who voluntarily leave themselves liable to it.

In the year 1805, after being for a time almost extinct, the small-pox prevailed so much in Norwich as to excite some attention. After being absent for a year or two, it was again casually introduced into Norwich in the summer of 1807, by an individual from London*, and from this source spread so extensively

* See Doctor Rigby's "Further Facts relating to the poor, &c." p. 93

amongst those whose obstinacy, or whose prejudices made them resist vaccination, that 203 deaths from small-pox were recorded in the bills of mortality, between the above period and the end of the year 1809. It appeared again in this city in 1813, in which year 65 deaths took place between the 10th of February, and the 3rd of September*, the mortality being limited to so small a number, by the early and extensive adoption of vaccination before the danger was actually at hand.

Former Pre-
valence of
small-pox.

From the year 1813, it may be stated that there was no small-pox in Norwich, until the rise of the epidemic which I purpose describing, not a death being noticed from that disease for above four years, and only one example of it having come to my knowledge, which was the servant of a celebrated public character, who accidentally was detained here by being seized with small-pox, but from whom the contagion did not, as far as I could learn, extend to any other individual.

The fresh introduction of the variolous contagion, which may be regarded as the source of the present epidemic, seems to have been

Origin of the
present Epi-
demic.

* Dr. Rigby's report of the Norwich Pauper Vaccination from August 10th, 1812, to August 10th, 1813, p. 6. Also the Edinburgh Medical and Surgical Journal, Vol. X. p. 120.

Rise and pro-
gress of the
Epidemic.

effected by a girl, who, travelling hither from York with her parents, was exposed to small-pox at a market town in the course of her journey, and came out with the disease as soon as she arrived here. This happened in the latter end of June, 1818; and the earliest cases of small-pox that were seen by any medical man, were traced to this origin. I have been able to ascertain the different families by which the disease was kept up during the remainder of that year, but it extended to very few, and proved fatal in only two instances. In January 1819, a Druggist inoculated three children, thus helping in a small degree, to spread the contagion, which the season of the year was calculated to keep within narrow bounds. Still no alarm was excited; a single medical man only was acquainted with the disease; and the cases of small-pox were so few until the latter end of February, as to be scarcely noticed. At this time, however, the disease extended from one of our greatest charity schools to all quarters of the city, and in the early part of the spring, laid the foundation for the most extensive destruction of human life that has ever, I believe, taken place in Norwich in the same space of time, from any other cause than the plague. It was comparatively dormant during the winter, and

when the season became milder, it burst upon us suddenly and unexpectedly, continuing its work of devastation for three or four months with undiminishing fury. The following list of burials taken from the bills of mortality will give a sufficiently accurate idea of the advance and decline of the disease.

1819	Deaths from small-pox	Deaths from other diseases	Total of deaths.
January - - - -	3	61	64
February - - - -	0	71	71
March - - - -	2	68	70
April - - - -	15	61	76
May - - - -	73	63	136
June - - - -	156	70	226
July - - - -	142	61	203
August - - - -	84	63	147
September - - - -	42	96	138
October - - - -	10	63	73
November - - - -	2	62	64
December - - - -	1	83	84
	530	822	1352

In June, when the greatest mortality occurred, forty-three were buried from small-pox in one week. The rapid declension of the disease from that period needs no further illustration than the above table; it was so nearly extinct at the end of the year, that I could not find a variolous patient from whom ichor could be procured for the purpose of an important experiment. The 530 individuals who thus fell a

Mortality
from small-
pox.

sacrifice to this horrid disease, give the following table in regard to their ages, and I have been careful in arranging it correctly, that it may be compared with the next chapter of this work.

Under two years of age - - - - -	260
Aged from two to four years - - - - -	132
four to six -----	85
six to eight -----	26
eight to ten -----	17
ten to fifteen -----	5
fifteen to twenty -----	2
twenty to thirty -----	2
thirty to forty -----	1
	530

The bills of mortality do not include the burials in some of the hamlets of Norwich, and therefore a few more may be added to the list of deaths; and having found, by observations derived from various sources, that probably one in six of all who were affected with the epidemic have died of it, I am convinced it is not far from the truth to assert, that considerably above 3000 individuals, or a thirteenth part of the whole population of Norwich, had the small pox in the year of which I am writing. An immense proportion of these were seized with the disease in May, June, July and

Probable
number who
took the
small pox

August, the burials from small-pox in those four months being *four hundred and fifty-five.*

The effects of this epidemic have been confined, almost exclusively, to the very lowest orders of the people*, and the extent of the infection has been so great as to let few escape who were not proof against it either naturally or artificially. Of 200 cases, which I attended and kept a regular register of, from the beginning of March to the middle of August, there were

Register of
200 cases of
small-pox.

Mild - - - - -	75	}
Severe - - - - -	78	
Confluent - - - - -	42	
Petechal - - - - -	5	
<hr/>		200

These 200 cases occurred in 112 different families, and the 603 persons of whom those families consisted, may be thus arranged.

- 297 had small-pox formerly.
 - 200 had small-pox lately.
 - 91 had been vaccinated.
 - 10 resisted small-pox formerly and lately.
 - 5 resisted small-pox lately.
-

603

* In the whole of this chapter I speak of those who had the small-pox and had not been vaccinated.

We therefore find fifteen persons out of that number who resisted the small-pox under the most intimate exposure to it, which is about the proportion that Authors have stated to be naturally exempt from the disease.*

In this epidemic, the disease has assumed different characters, from the mildest to the most severe; from a few pocks which scab in six or seven days without any perceptible indisposition, to an eruption attended with petechiae, sloughing or mortification: and not unfrequently these extremes were observable in children of the same family. In one child of the 200 cases that I registered, a small cluster of

* This proportion has been differently estimated. Sauvages says one in twenty are exempt (*Nosolog: Methodica.* T. 2. p. 368). Dr. Haygarth mentions the same number (*Sketch of a plan for exterminating the casual small-pox from Great Britain*, p. 32 of the introduction). Dr. Woodville is quoted by Mr. Ring as having found one in sixty resist inoculation at the small-pox Hospital. We must remember that some only resist the disease for a time, whilst others are proof against it through the whole of life. This throws a difficulty in the way of our calculation, that must ever prevent our obtaining a perfect estimate, and perhaps we shall never get nearer the truth than by fixing the average at one in fifty. The exemption has been conjectured to be owing to the foetus having had the disease in utero. The casual cow-pox is the only other cause we can assign for it. I have met with no exception to the observation of Dr. Haygarth, that infants under one month are proof against the contagion. The five at the bottom of the above list who resisted the small-pox were children born since the disease last prevailed here, and they also resisted repeated vaccination. The ninety-one who had been vaccinated, are spoken of in the next chapter.

pocks upon the face dried up in three or four days, whilst a few upon the arms and legs stood the usual time of mild small-pox, and were surrounded, on scabbing, by an elevated ridge of the cutis; three others in this family being at the same time reduced to a wretched state of suffering, by the severest course of the disease. In another, the pocks were small, had a pearly appearance, did not go through their regular course, not being above half the size of those in mild cases where the pocks were not more numerous, and I doubted whether it ought not to have been regarded as spurious small-pox, till I found the girl resisting frequent exposure to the variolous contagion for three months afterwards. In many of the severer cases, where the pocks were coherent rather than confluent, warty elevations of the skin remained on the falling off of the scabs, and were subsequently removed by absorption. These were generally situated upon the face, less frequently upon the arms; and sometimes the absorbing process went so far as to produce pits in the place where the elevations had been situated. It is my wish however to avoid a detailed account of the varieties which the eruptive disorder has assumed, because they have not appeared to me to be different from what the best writers have already described,

Various characters of the Epidemic.

Worst effects
of the Epidem-
ic.

nor from what most probably occur in every epidemic of the like kind. I saw several instances of recovery where the pustules assumed a dark or purple hue from their contents being mixed with blood ; but all the petechial, and most of the confluent cases, terminated fatally, and the severe cases were often succeeded by the most dreadful consequences. In one child, mortification commenced in the cheek, and extended over one half of the face. In a girl, fourteen years of age, who ultimately died, the *labia pudenda* sloughed away. A phagedenic ulcer, in a third case, spread from the angle of the mouth and destroyed the lower lip. Every epidemic has, without doubt, some peculiarities. In this, bloody stools attended many of the worst cases, but in no instance did I observe the urine to be tinged with blood. Three of the 200 cases which I registered had one eye completely destroyed, and two others had one eye injured by specks. Three out of that number had also undergone variolous inoculation. One of these, inoculated by its mother, sunk under a severe disease and bad management ; the second struggled through an abundant burthen of pocks, and recovered ; in the third an extensive abscess was excited in the arm by the insertion of old variolous matter without producing small-pox, and

the disease being caught soon afterwards, sloughing attacked the inoculated part and the child died.

The malignancy of the contagion in this epidemic cannot be doubted; but the disease was often aggravated, and made to assume its worst characters, by the most injudicious treatment. Indeed the excellent remark of Sydenham was never, on any occasion, more strongly verified than on the present.* The prejudiced and most ignorant being the principal sufferers, the prescriptions of old women were more listened to than the advice of the medical attendant; a practice kept up by tradition amongst the poor in this city for above a century was revived in spite of all remonstrance; and the treatment pursued, when not interrupted by professional interference was, in a few words, as follows: "At the commencement, to set the object before a large fire, and supply it plentifully with saffron and brandy to bring out the eruption; during the whole of the next stage, to keep it in bed covered with flannel, and even the bed-curtains pinned together to prevent a breath of

Injudicious
treatment of
the small-pox

* "In singulis ferme ædibus reperiatur stolida aliqua, ac sciola, " muliercula, quæ in hominum perniciem, quam non didicit artem " exerceat." Sydenham: *Opera*, p. 153.

air; to allow no change of linen for ten or more days, until the eruption had turned; and to regard the best symptom to be a costive state of the bowels during the whole course of the disease." Such were the means by which the horrors of this epidemic were aggravated. The old nurses triumphed not a little in having an opportunity of shewing their skill after it had been so long unexercised; nor was it often easy, amongst the deluded persons in whose families this affliction occurred, to persuade or compel them to adopt a different plan of treatment. To the list of deaths and loss of eyes already enumerated, we may add some less immediate effects of the small-pox, as consumption, swelled glands, ruined health, abscesses, and disgusting deformity of visage, which altogether make a catalogue of disease and misery, that I hope, for the sake of my fellow creatures and fellow citizens, never to have occasion again either to witness or to describe.

Causes of its extensive and rapid spreading.

The neglect of vaccination, it will be presently shewn, was one of the reasons of the extensive prevalence of this pestilence. The removal of families from the country to Norwich, during a flourishing and improving state of our manufactures for two or three preceding years, also gave a sudden increase

to the number of those liable to the disease. This cause had operated in its full extent at the invasion of the epidemic, which was in the summer of 1818; yet comparatively very few of those liable to small-pox were attacked by it during the following seven or eight months, and it was not until the spring of 1819 that great numbers fell down with it. After that time, however, three fourths of all those persons in Norwich who were not protected against it soon became affected by the contagion. It therefore remains to be accounted for, why the disease spread thus rapidly, expiring, as it were, of starvation, in a few months, whilst commonly it might have gone on for two or three years, before the same number of individuals, distributed amongst a population of 40,000 inhabitants, would all have taken it. Several causes may be enumerated as having contributed to this effect: the free intercourse which the children of the poor have with each other in a mild season—the obstinacy of parents in voluntarily thrusting their children into danger, which it was their duty to have avoided—the practice of variolous inoculation upon four or five hundred*, each of which thus

* These inoculations were practised almost entirely by old women and a Druggist, and scarcely any were inoculated until the latter end of March, or the beginning of April.

became a centre of contagion—the public exposure of hideous objects, just recovering from the disease, and loaded with scabs, at the corners of our most frequented streets—still it appears to me that these are not sufficient to explain the rapid spreading of the disease, and we must conclude that the state of the atmosphere in May, June and July, disposed the system to receive the infection on slighter exposure than at any previous period since the introduction of the disease. On enquiry, I have not found that the weather in those months was remarkable, in regard to moisture, wind or temperature; it was mild, dry, and seasonable, without being marked by any obvious peculiarity.

It is certain that the epidemic at its commencement was milder. The first petechial case which I saw was in the latter end of May. The virulence of the contagion seemed to keep pace with the increasing prevalence of the disease, and to be heightened in proportion to the number suffering from it at one time. After three or four months the petechial forms were no longer observable, and the epidemic declined by getting milder as well as less frequent, and by assuming the same moderate character with which it commenced. The rapidity with which it spread was the cause of its

early cessation, it being probable that, at the end of the year of the epidemic, not a hundred individuals were to be found in the city, (save infants a few months old,) who would be affected by exposure to the variolous contagion.

My object is to catch a few of the leading characters of the epidemic small-pox, rather than to attempt a description of all the phenomena presented by it. In several instances I have met with severe small-pox in adults, who had, at various times before, both in Norwich and in London, resisted the intimate and continued exposure to the contagion of that disease, and who supposed, with some appearance of reason, that they should for ever be free from it*; a circumstance which seems to prove the virulence of the contagion by which the epidemic has been kept up and extended. I have also met with several who were supposed to have had small-pox formerly, and have,

Persons at-
tacked with
small-pox
who formerly
resisted it.

* Such circumstances have been continually noticed. See particularly Huxham on Fevers, p. 130. The most singular instance of the kind that I have ever heard of, was communicated to me lately by my father-in-law Mr. Bayly, who received the anecdote from one of the Suttons, with whom he was well acquainted. "A man who believed himself to have had the small-pox, lived for *twelve years* as a nurse in the establishment for the reception of inoculated patients, which the Suttons had near Norwich, continually waiting upon the patients who were undergoing the disease; and at the end of that time he caught the small-pox, of which he died."

notwithstanding, taken it lately; from amongst which I select the following, as the strongest case. Such instances shew, either that small-pox frequently occurs twice to the same person, or that the public, and even medical men, are often mistaken in their opinion of what is small-pox.

Small-pox in
those supposed
to have
it formerly.

A girl, whose age is at present about thirteen years, was supposed to have had small-pox above eleven years ago, when that disease was prevalent in Norwich. Her parents, desirous she should have it, took her to the house of a relation where the disease existed, and, about a fortnight after this exposure, she came out with an eruption, which was at three different times seen by a most respectable physician in this city*, at intervals of two or three days, and pronounced by him to be small-pox. The parents, satisfied with this assurance, took no future means of security by vaccination or inoculation. The eruption left scars upon different parts of the body, and a cluster of these, nine in number, were very observable, when I was called upon to attend her. The scars were mostly of a circular shape, rendered evident by being of a lighter colour than the surrounding skin, without any perceptible pits or

* The late Dr. Henry Reeve.

depressions. Several of them were as large as the flat surface of a split pea. In July this girl, after four days illness, came out with small-pox, which went through as regular a course, and formed as large pustules, as any moderately severe case that I witnessed during the epidemic, which was at that time still extensively prevailing.

In other instances, those who were supposed to have had small-pox at an early period of the epidemic, were seized with it in a serious way afterwards, proving the error of the former opinion. In a family where several children had been vaccinated, and one of them not, all had an eruption of a mild character which a medical man thought might be, and the parents were convinced was, small-pox; but in a few weeks the child which had not been vaccinated went through severe and regular small-pox, the rest escaping.

Small-pox in
those suppos-
ed to have
had it lately.

A child one year and three quarters old had most severe small-pox in the month of July, which proved confluent in many parts of the body and terminated fatally on the eleventh day. This child had an eruption three months previously, which stood up larger than any of the variolous pocks, and dried into large scabs, leaving scars in different parts of the body. Some of these scars I saw upon

the abdomen when I was first called to attend the child ; they were circular, of a lighter colour than the surrounding skin ; exactly in the situation of one of them, a variolous pock had come out, which was so much smaller than the scar, two days before the child died, that the margin of the scar could be seen around the circumference of the pock. The parents had refused or neglected vaccination in the firm belief that their child was already safe from the prevailing malady.

Such examples as the preceding cases furnish have been very frequent ; and a few instances have also occurred where the evidence seemed even more strongly to favor the opinion that small-pox had occurred twice to the same individual with the interval of several years between the two attacks. The only well-attested case of small-pox after inoculation that I have seen was a patient of Mr. Gowing's, who kindly permitted me to make particular observation of it. The patient was twenty-four years of age, and had been inoculated when a child, by a Surgeon who now resides in this city. The mother asserts that he had a plentiful eruption produced by the inoculation, and was ill for three weeks ; he has one large scar upon the arm. In June he was seized with the small-pox, which went through a severe and regular course,

Small-pox
after inocu-
lated small-
pox.

the pocks being so abundant as to make the event uncertain. Some of his brothers and sisters, who had been inoculated at the same time with himself, waited upon him throughout his illness without experiencing any inconvenience. I would not trust to a case where no eruption attended the inoculation, but I consider the testimony in this instance to be complete, and it was evident that the small-pox in duration and progress was regular and not at all changed by the previous inoculated disease.

I do not presume that these few pages will throw any new light upon the history of a disease which has employed the pens of thousands for a century past ; but I do think it will hereafter appear extraordinary that, above twenty years after the discovery of a mild and unobjectionable means of rendering the human system, with a few exceptions, proof against small-pox, 530 lives should in a short time have been sacrificed to this disease, in an enlightened city, where humanity abounds and charity seeks for every measure to prevent and relieve distress. The melancholy fact I have, therefore, been willing to record ; and having thus briefly described the disastrous effects of the variolous poison I shall proceed to consider the employment of its antidote.

C H A P T E R II.

Of the Cow-pox.

SOON after the inestimable discovery of vaccination became generally known, it was introduced into this city, and was shortly adopted by all the better classes of society; so that we may consider the practice to have stood the test of nearly twenty years' experience. In 1806 it had become so general, that variolous inoculation was almost entirely discontinued*, and was discountenanced and avoided by every respectable medical man. The poor have since then been vaccinated, partly by the City surgeons (who are paid for taking charge of the poor,) and chiefly by other benevolent practitioners, who gratuitously offer such a blessing to those, whose circumstances would prevent their obtaining it upon any other conditions. Such, however, is the indifference of the un-

Early Practice of Vaccination in Norwich.

* See Mr. Martineau's Letter in appendix No. 16 to Willan on Vaccine Inoculation.

educated, or the badly educated, to danger not actually at hand, that the number vaccinated has been trifling except when the small-pox was prevailing; and so many have neglected the means of safety offered to them, that small-pox, as already stated, has at different times been very destructive in Norwich. I have no means of determining precisely the extent to which vaccination was practised amongst the poor, during the first few years after its reception, and can only form an estimate of it by observing the degree in which small-pox has prevailed when once introduced.

In 1812 an alarm arose from the introduction of the variolous contagion, and the poor being backward in embracing vaccination, Doctor Rigby suggested to the court of Guardians that the additional inducement of a reward would more effectually bring them to submit to so desirable a measure than any other plan that could be devised. He urged his opinion with the same zeal and earnestness as he had done on many other occasions with a view to the obtaining of public good, and in the end prevailed on the court of Guardians to allow half a crown to every poor person, who should bring a certificate from a Surgeon of having satisfactorily gone through the cow-pox. The individual who proposed and the

Rewards for
Vaccination
to the poor.

public body which adopted so beneficial a measure, seem to me to be equally deserving of the thanks of the Inhabitants of Norwich, who may boast of having offered an encouragement to vaccination worthy of being followed in every part of the kingdom. The good effect of it was soon evident, above 1300 persons being gratuitously vaccinated by different Surgeons in ten weeks, and, from the 12th of August 1812, when the half-crown donation was first ordered, to the end of December in the same year, 1066 persons claimed and received it.*

Still we have to regret that nothing but actual danger, or the belief of it, can induce the poor to seek the security of their families from a malady nearly as bad as the plague. In proportion as the alarm of small-pox abated in the following year, the attention to vaccination in the lower classes relaxed, although it could be obtained gratuitously as before, and the temptation of a pecuniary reward continued to be held out to them. This last measure, if it failed to produce the very desirable effect of a constant and regular vaccination keeping pace with the supply of population by births,

* See Dr. Righy's Appendix to Further Facts relating to the care of the Poor, &c.—p. 10.

has proved essentially serviceable in another respect, furnishing us with a valuable and authentic record, by referring to which, we can ascertain the extent of pauper-vaccination for succeeding years, the half-crown rewards given by the court of Guardians for the six years preceding that of the epidemic being to the following number of individuals.

Pauper Vaccination for
six years preceding the
Epidemic.

511	received the reward in	1813
47	—	1814
11	—	1815
* 348	—	1816
49	—	1817
64	—	1818

Admitting that many of the poor had the cow-pox who did not claim the reward, the foregoing table may still be regarded as shewing the relative proportion, if not the actual number, of those vaccinated during each of the six years, and no document can prove more strongly how inadequate it must have been to meet the supply of population in Norwich, where the annual births are from a thousand to twelve hundred, and where the recent increase

* In 1816 there was an alarm of small-pox, but it did not extend from the individual who was casually seized with it in passing through Norwich.

of inhabitants by the removal of poor people from the country must have contributed greatly to add to the number of those requiring vaccination.

The neglect of pauper-vaccination will, therefore, account for the great number liable to small-pox at the invasion of the epidemic that proved so fatal in 1819. In the beginning of this year vaccination was little practised, until fears of the spreading of small-pox were excited, which was about the latter end of March. During the following month, great numbers were vaccinated gratuitously, when the occurrence of some untoward cases of small-pox after supposed cow-pox was exaggerated into such formidable stories by the ignorant, the idle and the evil disposed, that the employment of vaccination was considerably checked, and the feelings of parents greatly harrassed about the safety of their vaccinated children. Drug-gists and old women took advantage of this temporary agitation to press their favourite measure of inoculation, and even a few medical men, yielding to the popular clamour, or listening to the entreaties of their patients, took up the variolous lancet: but these occurrences were fortunately soon put a stop to, and reason again prevailed over selfishness and groundless apprehension.

The small-pox had already destroyed two hundred and fifty lives. The public attention had been called to the subject by letters from professional men of the highest character*. The deaths from small-pox in one week had amounted to forty three; and vaccination was beginning to languish, the failures after it being the gossiping and chit-chat of the day. It seemed therefore to be time to do something to check such an unnecessary destruction of human life, and a public meeting was accordingly convened by the Mayor in the beginning of July, to consider of the best means to stop the progress of the epidemic and to promote the practice of vaccination amongst the poor. Nothing could have been more effectual for the purpose than such a meeting, at which several hundred persons present had their feelings and judgment appealed to by the animated speeches of benevolent men ever warm in the cause of humanity and the service of the distressed. A committee was immediately formed, which in a few days obtained a census of the whole city, and the number still liable to the small-pox was found to exceed *seventeen hundred!* The next step was to provide the means of

Public pro-
ceedings to
promote Vac-
cination.

* See Dr. Rigby's and Dr. Yelloly's Letters in the Norwich Mercury, and the Norfolk Chronicle.

vaccinating those who required it. For this purpose all the medical men were summoned to meet together, and all of them, with only one or two (perhaps unavoidable) exceptions, did attend; and, forgetting slight differences of opinion as to the exact degree of protection afforded by the cow-pox, they all united in one

Unanimity of
medical men
in recom-
mending Vac-
cination.

only reasonable means to be adopted for checking the dreadful progress of the small-pox. Each agreed to vaccinate all gratuitously in the district to which he was appointed and to visit at their own houses those who were desirous of it. From this moment vaccination was followed with great vigour, six hundred submitted to it in the course of ten days, and in a month half of those who by the census were found to require it, had received protection from the epidemic by having gone through the cow-pox. But neither persuasion, gratuitous attendance at their own habitations, the offer of a reward, nor the picture given in printed addresses of the horrors of the small-pox compared with the cow-pox, could make more than half of the 1700 submit to be vaccinated, the remainder being left to be the food of the raging disease, which was thus prevented from being extinguished until the end of the year, when universal vaccination would have banished it in one month.

Another effect arose out of the above proceedings, the discouragement of variolous inoculation, which, I believe, was not practised in a single instance amongst the poor, after the unanimous meeting of the medical men ; and a druggist and an old woman or two, who disseminated the disease by inoculation, were brought before the Mayor, and cautioned to discontinue their practices, lest they should lay themselves open to a prosecution, by a public injury being traced to them.

Discoura-
ment of Vari-
olous Inocula-
tion.

The exertions of the Committee formed for the promoting of vaccination amongst the poor have hitherto been limited to the purposes I have above detailed ; but it is to be hoped they will hereafter be directed to the means of insuring such a regular and extensive diffusion of the cow-pox as will prevent the possibility of any great mortality from the future introduction of the small-pox. We have sufficient security for the adoption of such measures in the president of that Committee, whose active benevolence extends to the whole human race. That they are necessary is proved by the state of vaccination at the time I am writing, the employment of it among the poor having rapidly ceased as the small-pox has declined. The truth of this remark is evinced by the following list of those who

Rewards for
Vaccination
in 1819.

received the reward of half a crown for vaccination in 1819.

January	- - - - -	26
February	- - - - -	51
March	- - - - -	101
April	- - - - -	226
May	- - - - -	226
June	- - - - -	92
July	- - - - -	301
August	- - - - -	359
September	- - - - -	14
October	- - - - -	4
November	- - - - -	2
December	- - - - -	0
		Total 1402

A considerable portion of the gratuitous vaccination of the poor having fallen upon me, I have had extensive opportunities of observing the practice. In March 1819, I vaccinated a great many, but kept no list of them until the reputation of the practice came into disrepute by the report of numerous failures. In the early part of April, I began to keep a regular register, and, during the remainder of the year, I vaccinated above 700 who came to me from different parts of Norwich* and its neighbourhood. To the whole of this business I at that

* Only 425 of those in Norwich who had the Cow-pox perfectly in consequence of my Vaccinating them received the reward from the Court of Guardians in 1819.

time paid the strictest attention, even to the neglect of other avocations, that I might put no obstacle in the way of the safety of those who were willing to avoid the impending danger. An extract from my register, of 500 persons who applied to me between the 26th of April and the 25th of July, (the period in which I vaccinated the greatest number,) will shew the state of the practice when conducted under such circumstances. In all of these I made two incisions in each arm, employing ichor taken directly from a proper vesicle on the eighth day, just before the areola is formed, and inserting it with a clean lancet. It was necessary to do this rapidly, but I have not found that if pure and fresh ichor be used, it has taken less frequently than when done slowly and with greater precaution.

It requires to be noticed that this register was kept at a most unfavourable time, when the small-pox was in every quarter of the city, and the greatest apprehension was afloat about the efficacy of the cow-pox. I have transcribed it from my notes without alteration, in the conviction that the imperfections it exhibits will not be attributed to negligence, but to their real causes, the imperfect provision made for vaccinating the poor, and the disadvantages attending the practice when small-pox actually prevails.

Register of
500 who ap-
plied to be
vaccinated.

A Table of FIVE HUNDRED PERSONS who presented themselves to be Vaccinated.

Passed through the cow-pox with four satisfactory Vesicles.	}	203
Passed through the cow-pox with three satisfactory Vesicles.	}	66
Passed through the cow-pox with two satisfactory Vesicles.	}	64
Passed through the cow-pox with one satisfactory Vesicle.	}	29
Had one regular Vesicle and smaller Vesicles produced by testing.	}	22
Vesicle injured before the formation of the Areola, and the progress of the Disease stopped.	}	1
Vesicles rubbed after the formation of the Areola, so as to leave an irregular scab.	}	15
Deemed imperfect from the appearance of the disease, independent of external injury.	}	12
Resisted Vaccination after reiterated insertions of the Ichor.	}	35
Came out with small-pox during the progress of the Vaccine disease. (<i>none ending fatally.</i>)	}	17
Came out with small-pox without vaccination having taken effect. (<i>two died.</i>)	}	12
Discontinued to attend before the vaccine disease was completed.	}	8
Did not return after the first insertion of the vaccine Ichor.	}	16
		500

The number therefore that went through the disease satisfactorily out of 500 was only 384, unless we add those, whose vesicles were rubbed and injured after the areola had formed. The child in whom the vesicle was destroyed before the areola had made its appearance, resisted a second insertion of the ichor, and I could not make the parents submit to a further trial. The number injured by rubbing is not greater than will occur in those vaccinated at different ages, and is to be diminished by vaccinating at a proper period, as it happens chiefly in those past the infantile age. Of the twelve cases deemed imperfect, several were on account of the vesicles being small and not characteristic, drying into an irregular scab, on the removal of which a little pus was found beneath. Two were deemed imperfect from the vesicles being very small, the areola not exceeding the size of a sixpence and the scab falling off in nine days. All these were subjected afterwards to repeated vaccination. The great proportion that resisted the cow-pox is accounted for, by my refusing none who applied, and consequently many of these were persons who, from the appearance of the scar or the recollection of some irregularity in the disease, were doubtful of their safety from a previous vaccination; others were adults

Proportion
that resist
Vaccination.

uncertain of having had the small-pox, yet who might formerly have gone through it mildly; so that not above one third of the thirty five were persons actually insusceptible of cow-pox from birth, which reduces the proportion to what we might expect, and which is according to my observation, about one in fifty. It is right, however, not to decide hastily that a person is incapable of receiving the cow-pox. I persisted in vaccinating one child of the five hundred six times, making four punctures each time, and in every trial except one, using ichor transferred immediately from a perfect vesicle, the last attempt succeeding, and then only one vesicle being produced. Had the vaccination with a single puncture been practised, this child might have been thought proof against the infection, as neither the Surgeon nor the Parents would have persevered until the vaccine lymph had been inserted twenty-four different times. One or two resisted vaccination in consequence of a cutaneous eruption, and in such cases it would have been proper to have deferred the operation until another time, had small-pox not been prevailing.

The number which discontinued to attend was increased by the distracting and unfavourable reports in circulation. Yet I believe that the table I have drawn up of five hundred

persons may be considered as a fair example of what gratuitous vaccination among the poor is in large towns, where no special provision is made for that purpose, and when small-pox is prevailing. It is surely impossible to refer to this table, without coming to the conclusion that such a plan of pauper-vaccination is very inadequate to answer all the good that might be accomplished, and that the greatest difficulties and dangers arise from deferring the practice until small-pox is extensively prevailing. The danger must be foreseen or it will never be prevented, and the security of all cannot be obtained if we wait until the enemy is within our walls.

I have attempted to give some account of the practice of vaccination in Norwich, from its first introduction up to the present time, more particularly during the epidemic of 1819, and I am induced from extensive documents, derived from my own inquiries amongst several thousands of the poor, from the general census taken in July, and from information communicated to me by Dr. Yelloly, who instituted inquiries in a certain district similar to my own, to estimate that 10,000 of the present inhabitants, or one fourth of the whole population, have gone through the cow-pox, and that above 8,000 of them had been vaccinated previously

Probable
number vac-
cinated in
Norwich.

to the invasion of the epidemic. The protection afforded to these, in the midst of the most destructive small-pox will, I hope, be fully shewn in the progress of this part of my work ; but I wish here to introduce a general result of what happened to the vaccinated in the families where the *two hundred* cases of small-pox occurred of which I kept a particular register. In *forty-two* of the *hundred and twelve* families, those who had formerly had the cow-pox lived in the same house where the small-pox existed, and as the lowest classes of the poor were the sufferers, the *ninety-one** vaccinated persons were continually in the same room, and often lay in the same bed, with the variolous patients. *Thirty-four* were vaccinated during the epidemic, after the small-pox had appeared in their families, and were thereby prevented from having the latter disease. The remaining *fifty-seven* had the cow-pox at different periods, from three to twenty years, viz.

From <i>three to five</i> years - - - - -	<i>3</i>
— <i>five to ten</i> years - - - - -	<i>37</i>
— <i>ten to fifteen</i> years - - - - -	<i>11</i>
— <i>fifteen to twenty</i> years - - - - -	<i>6</i>

57

None of them had been vaccinated less than three years, shewing the neglect of the

* See Chap. 1st, page 7.

practice ; and nearly all had been vaccinated before or during the year 1813, the last time that small-pox was prevalent. Twelve of these fifty-seven were parents who had been vaccinated from seven to twenty years, and who nursed their own children with the small-pox without sustaining any injury. Of the remaining *forty-five*, two had modified small-pox ; the case of one of these will be related at length in a subsequent chapter* ; the other had a mild disease, limited to twenty pocks, and lasting only six days, before it began to decline ; this girl had been vaccinated nine years, the other five years, and each had a small indented scar on one arm. With these two exceptions, all the vaccinated escaped from any indisposition or eruption, in consequence of their intimate exposure to the variolous contagion, which was of the most malignant nature, as it proved fatal amongst the unvaccinated in twelve of the families where the vaccinated, living in the same room, remained safe. One vaccinated child had the form of chicken-pox which has been called crystals or water-pox, and the disease extended to her brother who had within a few weeks recovered from the small-pox. The short history of 112

Proportion of
the Vaccina-
ted affected
by exposure
to Small-pox
contagion.

* See Chapter 5, Case 8th of this first part.

families, comprising 603 persons, is, that 200 had small-pox; one of whom had, three months previously, gone through the chicken-pox, and another had the same disease a few weeks after the small-pox; 91 had been vaccinated, two of whom had modified small-pox and one had chicken-pox; and the remaining 312 who had small pox formerly, or possessed a peculiarity of system, enabling them to resist it, had no eruptive disease of any sort during the epidemic.

In speaking of the safety of the *ninety-one* persons who had been vaccinated and who lived in the same room with those suffering from small-pox, I refer to the whole course of the epidemic. At the close of the year, when the small-pox was nearly extinct, I visited the 112 families, enquired into the state of every individual, and found that I had no alteration to make in the above account of them, except that one parent told me three of her vaccinated children had an eruption, in the severest case amounting only to eleven pocks, whilst her unvaccinated child was labouring under small-pox that proved fatal. I took this opportunity of noticing particularly the scars left by the cow-pox which had afforded such protection under the closest exposure to the most virulent contagion, and, in the 57 who had been

Examination
of the scars
left by Vac-
cination.

vaccinated from three to twenty years, I observed the following appearances:

A small shining scar upon one arm	- - -	3
A small foveolous scar upon one arm	- - -	8
A large foveolous scar upon one arm	- - -	21
A scar upon each arm, in some indented or foveolous, in others shining like a <i>cicatrix</i>	} 18	
Two small foveolous scars upon each arm	- -	1
A scar scarcely perceptible	- - - - -	6
	<hr/>	
		57
	<hr/>	

The two instances of modified small-pox, occurred in those who had only one small foveolous scar. Of the six in whom there was scarcely a perceptible scar, one was a child vaccinated five years ago; the remaining five were adults, two of whom were vaccinated seven years, one fifteen years, and two sixteen years ago. The reason of their having so imperfect a scar, I am unable to explain; it is possible some of them resisted the proper course of the cow-pox, and were equally capable of resisting small-pox, but it is certain that they were as safe as those in whom the scars were well marked.

I have limited my report to 200 cases of small-pox and 603 persons, because I conceive that at the present day, no documents can possess much value except they help to ascertain

the proportion, in which the vaccinated are likely to be affected by small-pox contagion*. If this object is not kept in view, a writer may collect instances of failure or of protection without answering any other purpose than to shew the possibility of the one or the other, and without establishing which is the general rule and which the exception. Were separate cases of protection of much weight, I might introduce my own as an example, having had the cow-pox about twenty years ago, which

* In the month of June I visited 500 poor families in those parts of Norwich with which I was least acquainted, in order to ascertain the proportion and extent of the failures after vaccination. In the course of these visits I took an account of 1377 persons, under twenty years of age. Of these 358 had small-pox formerly; 357 were seized with it lately, and 50 of them had died; 420 had been vaccinated at different periods from 15 years to a few weeks, and eleven of these had lately suffered from an eruptive disease, unattended with danger, but seeming in most of them to have been modified small-pox; 242 were still liable to small-pox. In 31 families those who had had cow-pox were living in the same room or lying in the same bed with others suffering or dying from natural small-pox, yet remained perfectly safe, with the exception only of one child, whose mother reported that it had *ten pustules!* From some cases which I had seen in other quarters, and of which a particular account will be given, I was surprised to find no more serious failures after vaccination, and was astonished, considering the way in which the practice is unavoidably conducted amongst the poor, to find it so very effectual. Altogether, in the course of five months, I met with 77 families where the vaccinated were in the same room with small-pox; and none of them had any serious disease, and not above one in 30 had any eruptive disease at all.

left one shining scar upon one arm, and has secured me from danger during the plentiful exposure to small-pox which it has been my lot to meet with. Besides the exposure to variolous contagion, several hundreds of those vaccinated from the earliest period of the practice until within a few weeks, have been subjected to the additional test of inoculation with variolous matter during the epidemic, and in no instance has regular small-pox, as far as I have been able to ascertain, been produced. In about one in forty or fifty, a spurious eruption has appeared, in some presenting a few irregular pimples, in others resembling the variolous pock ; but I have not learned that the latter have ever proceeded regularly, invariably drying up in four or five days, and never taking the course of regular small-pox.

The present state of vaccination in Norwich, I have sufficiently explained to be most unsatisfactory, the poor again neglecting to get their children vaccinated as they arrive at the proper age, and thus laying the foundation for a future epidemic, whenever the seeds of it shall be unhappily introduced among them.

C H A P T E R III.

Of Small-pox and Cow-pox occurring together in the same Individual.

THE possibility of these two diseases occurring together in the same individual was one of the earliest facts established after the promulgation of the discovery of vaccination, and one of the most interesting, because there are very few examples of two constitutional disorders existing in one person at the same time, and because all other diseases, as typhus fever, measles, scarlatina, influenza, chicken-pox, generally, if not uniformly, stop the progress of the vaccine vesicle.

Inoculated
Small-pox occur-
ring with
Cow-pox.

Dr. Willan*, by inoculating with variolous ichor, at different periods, not exceeding a week, from the insertion of vaccine lymph into the arm of a person, produced a general eruption of small-pox at the same time with the vaccine vesicle, the former coming out before

* Willan on Vaccine Inoculation, p. 1—and his Reports on the diseases of London, p. 317.

the latter had completed its course ; but variolous matter inserted on the ninth day of the vaccination seemed to be wholly precluded. These experiments, confirmed by similar ones of Dr. Woodville* and others, have so far settled the period at which the cow-pox renders the system proof against the variolous poison introduced by inoculation. The eruption thus produced may come out as late as the thirteenth or fifteenth day of the vaccination, and possibly even later, after the vaccine scab has completely formed, but the disease is milder and shorter in duration than the inoculated small-pox, and the pocks do not commonly mature nor go through a regular course.

The period at which small-pox, in consequence of previous exposure to the contagion, may come out during the progress of the vaccine disease, is not so clearly ascertained, being a matter of accidental observation rather than of direct experiment. A few scattered and unimportant pocks may †, under these circumstances, come out at the conclusion of the vaccine disease; but most writers in Britain seem to regard the fifth or sixth day from the vaccination as the latest time at which small-pox may

Natural Small
pox occurring
with Cow-pox

* Dr. Woodville's Reports of a series of Inoculations for the Cow-pox. 1799.—† Adams's Popular view of Vaccine Inoculation, p. 130.

appear, and go through a severe course in conjunction with the cow-pox*.

Dr. Adams † has given the case of a child, which was vaccinated whilst small-pox was in the same house, and, the insertion being backward, the operation was repeated after a few days; but, before the latter could produce any effect, the former came forward and continued its progress. On the eleventh day from the first insertion of the vaccine ichor, the areola was formed, and three days afterwards some variolous pustules appeared, which dried up in a few days. This is the account mostly given of those cases, where the variolous eruption comes out at a late period of the vaccination, and the sixth day seems to be noticed in our popular works on this subject as the latest at which small-pox may come out during the progress of cow-pox, and yet assume a severe course.

The writer ‡ last quoted says, that “if the patient has been exposed to small-pox, and the feverish disposition should arise from that cause on the third day of vaccination, the cow-pox insertion will rather be hastened in its progress. It will afterwards proceed with the small-pox

* George Bell on the Cow-pox, p. 81. Willan on Vaccine Inoculation, p. 7. and his reports on diseases of London, p. 314.

† Medical and Physical Journal—Vol. 14, p. 199.

‡ Popular View of Vaccine Inoculation, p. 185.

pustule, retaining its proper figure, but without that surrounding redness which marks its genuine character.

Other writers* of less eminence have described cases in which the vaccine vesicle was retarded in its progress by the appearance of the variolous eruption in consequence of previous exposure to that contagion. My principal reasons, however, for introducing this subject in a separate chapter are, the great importance of rightly understanding it, and the errors that have frequently arisen from an ignorance of many of the phenomena that attend the combination of these two diseases in the same individual. In the early history of vaccination, the imperfect variolous eruption appearing at the conclusion of the vaccine disease, in consequence of previous exposure to small-pox, was continually mistaken for a general eruption resulting from the vaccine virus. More recently the variolous eruption occurring in a mitigated form with the cow-pox has been mistaken by an able writer for *varicella* as if not proceeding directly from the contagion of small-pox †.

Mistakes arising from small pox and cow-pox occurring together.

* Edinburgh Medical and Surgical Journal, Vol. 8. p. 51. London Medical and Physical Journal for April, 1801.

† That it may be judged whether a case has not been thus mistaken in the work I allude to, I shall transcribe it. "Paulin Cauvas, âgé de 23 mois, fut vacciné le 9 Novembre, 1816; cet enfant me fut por-

Where the eruption has come out sufficiently early in the course of the vaccine disease to take a severe character, it has been mentioned as a failure of vaccination *, and become the source of much injury to the public. For all these occurrences the Surgeon, who practises vaccination whilst small-pox is prevailing, should be prepared, and his mind ought to be strongly impressed with the possibility of the latter disease, under these circumstances, coming out abundantly, and even proving fatal, whilst

té le 18, il avait cinq pustules; il me fournit du virus, avec lequel j'inoculai deux enfans qui eurent, comme lui, la vraie vaccine. Le 21, les pustules vaccinales étoient sèches; la mère s'aperçut que son fils avait des boutons à la face. Le 22 et 23, ils se multiplièrent. Le 24, l'enfant était sans fièvre; les boutons commençaient à blanchir; ils étaient déprimés dans leur centre, et entourés d'un cercle rouge; ils présentaient une identité de forme si parfaite avec ceux de la petite vérole, que lorsque je prononçai que cet enfant avait la varicelle, on pensa que j'étais dans l'erreur. La ressemblance était, en effet, si grande, que, si je n'avais vu ce sujet que ce jour-là, et s'il n'avait régné, à cet époque, une épidémie de petite vérole volante, qui avait quelque analogie avec la vraie variole, j'aurais, peut-être, partagé l'erreur de ceux qui ne comparaient que la forme des boutons de cette éruption avec ceux de la petite vérole, sans faire attention aux différences des symptômes précurseurs de l'éruption, à la marche des diverses périodes de la maladie, à la nature de la fièvre et à sa durée. Le 25, la purulence était développée dans le plus grand nombre des boutons. Le 26, la desiccation commença; elle se continua le 27 et le 28. Je ne vit plus ce sujet." Berard et De Larit *Essai sur les Anomalies de la Variole et de la Varicelle*, à Montpellier en 1816.

* See Appendix No. 2, containing "Correspondence with Practitioners in Norfolk, &c." and several pages in the Correspondence of the Directors of the Dublin Cow-pock Institution, 1818.

the cow-pox is going on to all appearance regularly and properly.

Although the eruption of small-pox may come out during the progress of cow-pox, the contrary does not take place, the vaccine vesicle never coming forward after the variolous eruption has begun to appear. Where small-pox has come out on the second or third day after the insertion of the vaccine virus, the latter has rarely produced any effect. After the vaccine pock has begun to show itself, I have met with small-pox coming out at all periods until near the termination of the vaccine disease, and I have convinced myself that this has greatly mitigated the violence of the natural contagion, because, of about thirty cases, in which the two diseases have thus occurred together, none have died, and two or three only were apprehended to be in any danger*. In general the later the period at which the small-pox has appeared, the more mild has it been rendered, and the more perfectly have the characters of the vaccine disease been maintained. The influence of the two diseases has been reciprocal. If the small-pox has appeared before the time when the

Different periods at which Small-pox may appear during Cow-pox.

Reciprocal influence of Small pox and Cow-pox.

* Seventeen of these cases are alluded to in the table at p. 30, and are there contrasted with twelve other cases of natural small-pox, where the vaccination failed to take effect, and two out of the twelve died.

areola should begin to form around the vaccine pock, the latter has subsequently been altered in its character, losing its circular shape, becoming irregular, flatter, sometimes having its contents nearly absorbed, leaving an empty bag, and ending in an imperfect thin scab, whilst the variolous eruption has proceeded in its regular course. But where the appearance of the variolous eruption has been deferred until the areola had formed around the vaccine pock, this has ended in a regular scab, and the *variola* has, generally though not uniformly, proved mild, and often been confined to a few pocks, having sometimes the indented character and drying up in a few days without maturing. Appearing later than the ninth or tenth day from the vaccination, they have always, according to my experience, assumed this mild form, been in small number, and lasted only three or four days.

To these general remarks some exceptions must be admitted, a few of which I shall specify in the following cases. It is probable that the principal facts contained in this chapter are already known to many medical mén; but they are not, I will venture to say, generally known to the Profession, and seem not to have been noticed with sufficient minuteness, in any of the numerous works upon cow-pox, to make

the importance of them be properly understood.

C A S E I.

JAMES HEWETT, aged five years, was vaccinated by two punctures in each arm on the 25th of July, the small-pox being at that time in the family. On the first of August there were two very fine vesicles on the left arm, from one of which I vaccinated three other children. I also made two fresh incisions on his right arm, the first not having taken effect. On the evening of that day he was ill with fever, and on the afternoon of the 3rd of August (*the tenth day of the vaccination,*) a slight eruption began to appear upon the face. The next day I observed a few spots upon different parts of the body indicating the commencement of the variolous eruption. The two vaccine vesicles on the left arm were just beginning to dry in the centre, and there was a plentiful areola around each of them for about a circle of two inches diameter. These areolæ presented different shades forming concentric circles, an appearance which has been considered as characteristic of the true vaccine disease.* Upon the

Small-pox appearing on the tenth day of Vaccination.

* George Bell, speaking of these concentric circles which the different shades of the fading areolæ form, says, "this double ring, as it may be termed, is a distinctive mark of the real Cow-pox, provided it takes place after the symptoms already enumerated." *On Cow-pox, p. 42.*

right arm, two pimples had risen in the situation of the last insertions of the vaccine virus.

August 5th. (*Twelfth day of vaccination, and third of variolous eruption.*) The areolæ on left arm fading, and the vaccine vesicles drying into pale-coloured crusts. The general eruption advancing like regular small-pox.

August 7th. (*Fourteenth day of vaccination, and fifth of variolous eruption.*) The areolæ have disappeared, and the vaccine vesicles on the left arm are dried into regular scabs. Two pocks on the right arm, in the situation of the last insertions of the vaccine lymph, have assumed the appearance of the variolous eruption in other parts of the body, which is every where indented, flat and characteristic of true variola; but the symptoms are mild from the eruption not being very abundant. The pocks are most numerous upon the chest.

August 9th. (*Sixteenth day of vaccination, and seventh of variolous eruption.*) Two regular vaccine scabs remain upon the left arm. Upon the face, the eruption is now pustular. Upon the right arm, the two last vaccine incisions are apparently converted into true variolous pocks. This boy now shews the contrast of two regular dark vaccine scabs on the arm about to fall off, and a distinct variolous eruption over the rest of the body. Since this

eruption came out, he has been well enough to keep about, but to day has so much fever as to be confined to his bed.

August 11th. (*Eighteenth day of vaccination, and ninth of variolous eruption.*) The two vaccine scabs are fallen off from the left arm, leaving feeble scars not well marked nor indented. The variolous eruption is large and prominent, maturing equally in all parts of the body, and the basis of each pock being encircled with a red ring. Upon the face, incrustation has commenced, but for the most part the eruption on the face is still prominent, and has not begun to dry up. The two pocks from incisions on the right arm retain the variolous character.

August 15th. (*Twenty-second day of vaccination, and thirteenth of variolous eruption.*) The pocks every where encrusted, and in many parts the scabs fallen off, leaving blotches with a shining surface. The pocks from two incisions on the right arm have dried into thick convex scabs. Most of the scabs are of a pale colour, thick, rather convex, and approaching to circular. An elevated ridge surrounds some of them upon the wrists and hands. In three or four days the disease was terminated, by all the scabs having fallen off. Five months afterwards, I examined this boy's arms, and upon the left found two scars just perceptible and

not at all characteristic of cow-pox. Only three or four scars were left by the variolous eruption.

Another child in this family came out with small-pox on the fourth day after effectual vaccination, and had that disease much more severely, being abundantly pitted ; four vaccine vesicles had begun to rise, but they lost entirely their character as the small-pox advanced, becoming of an irregular shape, and drying into light-coloured scabs. A third child was seized with the small-pox before vaccination was adopted, and died of it, whilst two others were saved by vaccination, and had no variolous eruption at all.

CASE II.

Severe Small-pox appearing on the tenth day of Vaccination.

BRIGGS's child, aged five or six years, was vaccinated by me in four places, on 6th of July, with ichor transferred directly from the arm of a healthy child. On the morning of the 13th, four good vesicles had risen, from two of which I took a plentiful supply of ichor upon points. I observed the child then to be fretful and tedious. In the evening she had sickness followed by a severe convulsive fit. On 14th, the areolæ were beginning to form ; the child better than yesterday, but still suffering

considerably from fever. On 15th, the eruption of small-pox beginning to shew itself in several parts of the body. The vaccine pocks have a regular appearance, and have a blush around them to the extent of three quarters of an inch. On 16th, the areolæ have begun to fade, and are less extensive. The variolous eruption advancing. The child less feverish, and sitting up. On 17th, the vaccine pocks drying into dark regular scabs, and the areolæ gone. The variolous eruption consists of several hundred pocks, pretty equally distributed upon the body and limbs. On 19th, the vaccine scabs have a dark brown color; one of them has fallen off. The small-pox is advancing regularly. On 21st, three dark vaccine scabs still remain. Upon the face a few of the variolous pocks are beginning to dry at their apices. The rest upon the face, and all upon other parts of the body are still distended fully with their contents, which are mostly purulent. This child exhibits to day the cow-pox completed, or in its last stage, and the small-pox advancing regularly and not yet at its height. The child is feverish, but not confined to its bed. On 24th, all the vaccine scabs fell off two days ago. Many of the variolous scabs are separated from the face, leaving tubercular elevations. Upon the hands and arms, the eruption is dried into

regular scabs, a great many of which are surrounded by a circular elevation or ridge of cutis. There are a few crusts on the body, and those are very small. Upon the lower limbs, all the pocks are dried into scabs, with an elevated ridge surrounding most of them.

On 27th, all the scabs separated, leaving shining blotches of the cutis, encircled by a margin of separated cuticle. The vaccine scars are just perceptible, and are not at all characteristic. Five months afterwards, I examined the arms and could scarcely trace the spots on which the vaccine pocks had been situated. The blotches left by the variolous eruption, were still visible upon the limbs.

C A S E III.

Severe Small-pox appearing on the eleventh day of Vaccination.

FRANCES SWANN, aged one year, was vaccinated by me on the 18th of May. On the 25th, (being the eighth day of the vaccination,) there were four very fine vesicles, from some of which I took ichor and inserted it into the arms of two other children, who had in consequence a perfect form of the vaccine disease.

An areola, rather less extensive than usual, was formed around the vaccine pocks of Frances Swann on the two following days, and on the 28th of May, being the eleventh day of vacci-

nation, an eruption appeared, first on the face, and, in the course of the day, on other parts of the body, which took the usual course of variola in subjects of so young an age.

June 3rd.—The vaccine pocks have been retarded in their progress, are jagged at their edges, and not yet dried into scabs. The variolous pustules reach within one third of an inch of them, and are so numerous, that, if there had been many more they must have been confluent. They are fully distended, and many of them contain pus. June 5th.—The variolous pustules on the face, legs, and thighs, are beginning to scab; on other parts, not. 7th.—The four vaccine scabs still remain, thick, circular, convex and of a pale colour. All the variolous eruption has encrusted, and many of the crusts are fallen off. 11th.—Two vaccine scabs still remain. On this and the following day, nearly all the variolous scabs separated. The tender age of this child, and the abundance of the eruption, made me apprehend danger, and I thought it a severe case of small-pox. Six months afterwards, I examined the arms, and could only just ascertain where the vaccine pocks had been situated, the scars not being larger than pins' heads. The variolous eruption left several pits upon the face, and a few upon other parts of the body.

This case, in which the progress of the vaccine disease, after the formation of a slight areola, was retarded, affords an example of the latest period at which I have known regular small-pox appear in consequence of exposure to the contagion, previously to the vaccination, and it is also the severest instance that I have met with, when the variolous eruption has not come out until after the period at which the vaccine areola may be expected to begin to shew itself. It would, however, be unpardonable in me not to profit by the experience of others, in treating of cases that are not very frequently occurring, and the kindness of Mr. Carter enables me to add the following example.

C A S E I V.

Fatal Small-pox appearing on the tenth or eleventh day of Vaccination. **WILLIAM FUNNELL**, aged above four years, was vaccinated by Mr. Carter on Tuesday 13th July. On Monday the 19th, the vaccine vesicles, three in number, were rather forwarder than usual, and with ichor from one of them another child in the same family was vaccinated, which took the disease, went through it, satisfactorily, and was protected by it. On Wednesday the 21st, Mr. Carter saw Wm. Funnell, and found him very ill with fever. The following day, his mother states that she discovered

one pustule in the evening, but observed no general eruption until Saturday morning, the twelfth day of the vaccination. On Monday the 26th, the vaccine scabs were hard and brown, and the part just around them was the only place free from the variolous eruption, which proved so abundant that the child sunk under it on the following Thursday.

The facts noticed in this short chapter appear to me so requisite to be understood, that I have endeavoured to represent them in the clearest manner. They are interesting points in the history of the vaccine disease. It is possible they may afford us some assistance in explaining the sources of failures after cow-pox, and in determining the various degrees of modified small-pox. It is certain that they do not in any measure implicate the efficacy of cow-pox in preventing the small-pox, when the former has gone through its entire course. The consideration of them involves some rules of practice.—Firstly, to vaccinate although the variolous contagion may already have been caught*, as the small-pox, if not prevented, is most likely to be mitigated, should the vaccination take

Rules derived
from the oc-
currence of
Small-pox
and Cow-pox
together.

* A recent author has given contrary advice, and rashly recommended the Surgeon *not to vaccinate* when *small-pox* is *prevailing!*—“Fries de Inoculatione Variolarum Vaccinarum” p. 18—1817.

effect.—Secondly, to avoid all unnecessary exposure of patients undergoing the cow-pox, to the variolous contagion, until the areola is fading, because, although a great proportion will escape, there is a chance of some being affected by it, and it is desirable to shun even the most mitigated form of the variolous eruption.—Thirdly, when small-pox is prevailing, to give no decisive opinion of protection by cow-pox until the scab is about to fall off, that Parents may not be deceived, nor the powerful means of safety be unjustly brought into discredit.

It is very possible that the records of medicine may afford instances where small-pox has appeared as late as in the cases I have just related, and been severe or fatal.* To look over all that has been published within these twenty years was not in my power; and it is

* The original Vaccine Institution, in their report of eleven years experience, published in 1811, state that “the small-pox may break out at any period within twelve days of the inoculation for the cow-pock. If they appear earlier than the sixth or seventh, the *vaccina* is cut off in its progress; if they appear *later*, the *vaccine-pock goes forward in its usual course*”.——A writer in the Edinb. Med. and Surg. Journal (vol. 1, p. 67 of new series) observes that small-pox has come out two days after the vaccine vesicles had been surrounded with a perfect areola, and not been at all modified, but proving confluent and ending fatally. He is writing against Vaccination, and seems to regard this as an argument in favour of his own opinions.

sufficient to satisfy my own mind, and I hope to excuse me in the estimation of the public for relating these cases, to know that the leading and systematic writers have not distinctly pointed out the occurrences which this chapter is intended to illustrate and explain.

In speaking of these two diseases occurring together, I by no means intend to assert that they are capable of both taking place at the same time in all their stages, in the same individual. My observations, indeed, lead me to a very different conclusion. I believe that, invariably, one or the other of these diseases becomes altered and mitigated by the one of the two which prevails. The small-pox is altered, mitigated, limited to a few pustules which mature imperfectly and last only five or six days, if it does not appear until the vaccine areola begins to fade; and, in this case, the vaccine disease takes the lead, going perfectly through its whole course, even to the leaving of an indented and characteristic scar. If, before the areola is formed around the vaccine vesicles, the small-pox appears, this takes the ascendancy, and goes on through its stages, little or not at all modified, whilst the vaccine vesicles, although they may still put on many of the local appearances that are deemed characteristic, are

These two
diseases do
not occur to-
gether in their
usual inten-
sity.

diminished in their intensity, as is proved by their leaving no permanent and indented scar behind. The existence of the two diseases together, therefore, so as to maintain their usual intensity, and take in all respects a regular course, seems to be incompatible.

CHAPTER IV.

Of Small-pox after Cow-pox.

IN this chapter I mean to speak of real small-pox, such as has occurred in those who had not by any means been protected against it, and therefore I have materials for a very few pages. Having already stated the effects of inoculation upon *the vaccinated*, I have to relate such cases of regular small-pox as have occurred from *their* being exposed to the variolous contagion. These have been so rare, that I have not met with a single instance, either in my own practice, or in my inquiries amongst the poor; and it is only by having availed myself of the opportunities afforded me by the liberality of my professional brethren, that I have any thing to offer upon this subject.

At an early period of the epidemic, I saw one case of distinct small-pox, that seemed to

proceed regularly as to duration and size of the eruption. On the eighth day, when I examined the patient, the pustules were large and full.

Distinct regular small-pox after cow-pox

He had been vaccinated three or four years before, by an eminent Surgeon, who believed the cow-pox to have been satisfactory, and was surprised to witness so complete a case of small-pox. Two vaccinated children in the same family were inoculated from him without any effect.

Severe small-pox after cow-pox.

A girl nine years old had severe small-pox in June, and the eruption was so numerous, that a disgusting foetor issued from the body at the time of scabbing. Numerous pits were left in all parts of the body. She had been vaccinated when one month old, and one scar remains upon the left arm, having several small indented spots near the margin. A fortnight before she fell sick, her brother aged 10 years, and vaccinated when one year old, had modified small-pox, which lasted five days, and left a few minute scars upon the forehead. Five others of the same family had been vaccinated at different dates of 12, 11, 10, 5 and 3 years, and were unaffected by the contagion.

In May, I visited a tradesman's child labouring under severe small-pox. On the eighth day of the eruption, the tumefaction of the face was so great as to close the eye-lids. The body was much disfigured by pits. She had been

vaccinated nearly twelve years previously, and the mother states that several pimples came out upon the right arm at the time, one of which has left a slight scar. There is a large scar from the vaccination on each arm, without foveolæ. Her brother, vaccinated ten years, was inoculated from her, and lived in the same apartment with her, without inconvenience.

The son of a tradesman, 7 years old, was vaccinated at six months, his parents being accustomed to wait until their children attained that age. At the proper time ichor was taken to vaccinate others with, and it was so plentiful that enough was taken to vaccinate a great many. The surgeon continued his visits until the termination of the vaccine disease. Whilst the small-pox was raging, this youth was attacked by fever, and the Surgeon who attended him being sent for, found the scar on each arm so very good and perfect, that he could not apprehend small-pox. On the 4th day of this attack, he came out with small-pox, which proved confluent. I saw him on the 5th day of the eruption, which so covered the spots where the vaccine scars were situated, as to prevent my examining them. Seven days after this, he sunk under the disease. Six other children lived in the same house with him, and generally frequented the same room. The

Confluent
small-pox
after cow-pox

eldest of these had the small-pox formerly, and the remaining five, aged 11, 8, 5, 3 years, and 1 year, had each been vaccinated when about six months old. Four of them escaped all disease, but the one 8 years old, after severe illness, had 10 or 12 varioloid pustules, which stood five days.

*Conclusions
from this
case.*

In the above fatal case of confluent small-pox there is proof that the vaccination was deemed to have perfectly answered, and that ichor was taken from the arm: we must therefore conclude, either that fatal small-pox may occur after regular cow-pox, as has occasionally happened after natural or inoculated small-pox, or that the vaccine vesicle, after being fit to furnish ichor for communicating the disease to others, may be so altered in its course, as to leave the system liable to the severest form of the dreadful malady it was intended to prevent.

These five cases of small-pox occurred in the practice of four different professional gentlemen, and each of them was attended throughout the disease by the same Surgeon who performed the vaccination.

A case of petechial small-pox which I saw with Mr. T. Martineau Jun. was accompanied by circumstances that induce me to place it here, that I may suppress nothing of the apparent inefficacy of cow-pox in some peculiar

systems. The patient was 11 years old, and was in health until the beginning of June, when the variolous eruption shewed itself. The pocks came out irregularly and in clusters; attended with a rash, and interspersed with numerous petechiae. The motions were sanguineous. The child was torpid, and died on the sixth day from the appearance of the eruption. The mother reported that this child had been vaccinated when an infant, and as she removed to a fresh residence immediately after the insertion of the ichor, the progress of the disease was watched by another medical man, since deceased, who was so well satisfied with it that he did not recommend a repetition of the vaccination. She also observed that several small pimples appeared around the vaccine pocks, and a few broke out in other parts of the arms. Upon such a history we ought not to place much reliance; but it ought to be stated, and shall not be concealed, that upon each arm of this girl, there was a large circular scar marked with several foveolæ, and having such appearances that Mr. T. Martineau Jun. as well as myself and several other Surgeons who examined these scars, were of opinion that they must have been produced by vaccine pocks having arisen and gone through their different stages in those situations. A child six

Petechial
small-pox
after cow-pox

years old, unvaccinated, was taken ill ten days after his sister died, and went through severe small-pox. Two other children, vaccinated, one 13 the other 8 years, lived in the same room, and received not the slightest infection.

Conclusions
from this
case.

Upon this case of petechial small-pox, it appears to me that we must come to one of two conclusions—either, that such a case may occur after perfect vaccination—or that the foveolous scar, deemed to be characteristic of regular cow-pox, may remain after a vesicle, which was of such a kind, or had been so interrupted by accident or otherwise, as to leave the system liable to be affected in the most formidable manner by the variolous contagion.

Reasons for
relating these
cases.

This is the whole of my experience of regular small-pox succeeding cow-pox which was deemed to have been perfect, although I have sought for such cases in every quarter of the city, and have spared no labor to examine all reports of such events to the bottom. In how many of these few instances, the vaccine disease was erroneously pronounced to be perfect, or the system of the individual was possessed of a peculiarity that small-pox and cow-pox would have been equally ineffectual in preventing the subsequent attack, cannot by any means be ascertained. I have felt it my duty to mention these cases, because most respectable

Practitioners had expressed themselves satisfied with the vaccine disease which failed to afford the expected protection. Had I blazoned them forth to the public, and at the same time withheld the evidence in favor of vaccination, which will be found in different parts of this work, I should have committed an injury, for which I could make no adequate atonement; but I am not ashamed of the feelings which prompt me to relate them, nor apprehensive of the effects they may produce, being convinced that they can have no weight against the practice of vaccination, when compared with 10,000 vaccinated individuals living in the midst of a contaminated atmosphere—with 530 deaths amongst little more than 3,000 who had neglected to be vaccinated—and with the occasional occurrence of regular small-pox in those who formerly had the disease either naturally or by inoculation.

C H A P T E R V.

Of the concomitant eruptive Diseases of the Epidemic Small-pox.

IN the history of an epidemic, all the accompanying diseases should be noticed, that it may be shewn how far they have been influenced by the prevailing malady. The small-pox, during the year 1819, was so prominent, that few other complaints attracted particular attention, except those which bore some resemblance to it. The measles were hardly met with, having been very frequent and fatal the preceding year. Hooping-cough often occurred, and occasionally added to the danger of those who, whilst still suffering from it, fell down with the small-pox. I heard also of a few instances of scarlet-fever during the summer ; but upon the whole, the contagious complaints, which usually occur every year amongst children, were less frequent during the epidemic. In speaking of the

Infrequency
of other con-
tagious disea-
ses during the
epidemic
small-pox.

concomitant diseases of the small-pox, I have therefore to limit my observations to those, which seemed to me to be directly influenced or produced by it, or whose character and history are so implicated with it as to make it inexcusable to omit a succinct account of them. For the sake of clearness and arrangement, I shall treat of these eruptive diseases under three separate sections, without positively asserting, however, that they have been strictly confined to the class of individuals referred to.

SECTION I. *Of the eruptive Disease which has chiefly attacked those who had neither passed through small-pox nor cow-pox.*

Under this head I have only to mention the petechial fever, which has attacked but a small proportion of those liable to small-pox, and to them it generally proved fatal. It was most common in the months of May, June, and July, when the epidemic was at the worst. In the course of two or three weeks, I met with four cases of this fever, all of them happening in children liable to small-pox, and during the whole of the summer, I witnessed no instance of it in those who had previously gone through small-pox or cow-pox. I found the victims of it were mostly children, reduced to a feeble state by scrofula, or some other disease; and

Petechial
Fever.

as several were seized with it, whilst others in the same family were suffering from small-pox, I could not help suspecting that in all it was produced by the variolous contagion. After a few days or a week of fever, the patient became inactive, drowsy, too feeble even to support the weight of his own frame or to lift up a limb. A few purple or dark spots next appeared, increasing in number from day to day, so as to occupy the principal parts of the body, and varying from the size of a pin's head to that of a kidney-bean. Mostly the petechiæ assumed exactly the color and shape of spots made upon the body by scattering over it ink from a writing-pen. Every instance which I witnessed proved fatal at different periods from the third to the tenth day of the eruption.

In a case of this kind which I dissected with Dr. Yelloly in May, the petechiæ came out in less than forty-eight hours from the commencement of the fever, and were numerously displayed upon all parts of the surface of the body, except the face. They extended deeper than the skin, for on removing the scalp, we could see them even in the substance of the temporal muscle. The patient died on the fourth or fifth day of the eruption. The brain had no preternatural appearance. The stomach was contracted in the middle, to an hour-glass

shape, containing half a pint of dark-greenropy fluid, and its inner surface was beset with petechial spots quite as numerously as the external skin; yet there were no petechiæ in the lining membrane of the œsophagus, nor of the large and small intestines.

It is probable that the internal eruption is not always found in petechial fever, any more than in small-pox. It often happens, that in the worst cases of the latter disease, no traces of the eruption are found, on dissection, upon any of the internal mucous surfaces. Mr. Hull, however, dissected in June a child, a year and half old, which died on the sixth day of the variolous eruption, and found the rectum, colon and ileum, marked with circular patches, distinct, white, and having an appearance of indentation in the centre. They were here and there congregated into clusters, and were situated beneath the mucous coat, resembling in figure and diameter of surface the cutaneous eruption, of which they seemed, as Mr. Hull himself well expresses it, to be faint imitations. White patches were also observable in the jejunum, but neither circular nor indented. The œsophagus, stomach and duodenum presented none of these appearances.

Dissection
after death
from Small-
pox.

The situation of the petechial and variolous eruptions may hence be contrasted both as to

the external and internal surfaces which they occupy. Petechiae rarely or never are seen upon the face, which is the part most abundantly covered with the variolous pocks ; and these in certain cases are on dissection discovered in the intestines only, whilst petechiae variegate the lining membrane of the stomach.

Contrast in situation of petechial and variolous eruptions.

Why the vaccinated and variolated should have escaped the petechial fever, unless it depended upon the *variolous contagion*, I can offer no satisfactory reason, and am very much inclined to assign every case of it, which occurred during the epidemic, to *that origin*.

SECTION II. *Of the eruptive Diseases which seem to have occurred indiscriminately in those who had passed through small-pox or cow-pox, and in those who had not had either of these disorders.*

Complaints of this class have been unattended with danger, and claim a particular description on account of their importance in diagnosis. They have not been remarkably frequent, compared with other eruptive disorders, already, or hereafter to be, noticed, and I am doubtful if they have any direct connexion with the variolous contagion. The symptoms preceding the eruption I have found to be head-ach, pain in the back, and general

febrile indisposition for several days, in one or two instances even for ten days previous to the vesicles appearing. Sickness, vomiting, and in one case convulsions, immediately preceded the eruption, on the coming out of which, the symptoms were relieved, and the children, (to whom this class of complaints was nearly confined,) followed their usual amusements. The precursive symptoms have been very uniform, and the character of the disease has varied so little, that the detail of a single case will form the best basis for a description of it.

Precursive
symptoms of
the disease?

After the febrile symptoms just enumerated, Miss B. came out with an eruption upon the shoulders, arms, face and body, which presented in twenty four hours numerous vesicles, transparent as crystal, and composed of a colourless fluid enveloped in the delicate cuticular membrane. Many were already large, oval and prominent; others were of an irregular shape and jagged at the edges; whilst others were as small as pins' heads, and pointed at the top. All of them were surrounded with a blush of an irregular shape, as if each vesicle had risen in the centre of a large flea-bite. The vesicles existed in considerable number on the scalp amongst the hair. The itching was intolerable, and several of these delicate vesicles were, at my first visit, broken and dried away,

Case of the
disease detail-
ed.

leaving the flea-bite stains upon the skin. The throat was a little sore, and a single speck was observable upon one tonsil.—*3rd day.* Several fresh vesicles have come out; many of the original ones are destroyed by scratching and rubbing; others which remain uninjured, and which were yesterday crystalline, are now filled with turbid or milky fluid, and the delicate cuticular covering is semi-opake.—*4th day.* The original vesicles, which have not been injured, are dried up into irregular crusts, small and shrivelled in comparison of the size of the vesicle.—*On 5th and 6th days,* some fresh vesicles came out and grew quickly as the first, drying up into shrivelled and irregular crusts in three complete days from their first appearance. Those which came out last were smaller, containing little fluid, the cuticle forming the covering or bag not being firmly distended, nor pellucid, but a little opake, and the contained fluid approaching to purulent. The crusts fell off in a few days, the irregular stains upon the skin remaining a week or two longer. Several of the vesicles were so scratched as to form ulcers, which on healing left scars upon the arms and shoulders of a lighter colour than the surrounding skin. This young lady had frequented the house of a relation where I had attended the only three children of the

family ten days before with an eruption of exactly the same character.

The varieties which I have observed in this eruptive disease have been in the number and size of the vesicles. The stains in the skin which I have described in the case given at length, were an erythematous blush rather than an inflammatory circle, and I have seen that blush entirely wanting, the prominent vesicle being surrounded with skin of the natural colour, and no part being red but the portion of skin which the vesicle immediately covered. I have seen some of the largest of these vesicles oval in shape, and one third of an inch in their longest diameter.

The characteristic mark of this eruptive disease has appeared to me to be, that *every* vesicle is a single cavity, and that all the fluid of one vesicle passes out by a single puncture, because it is not composed of separate cells. The throat has generally been sore, but rarely if ever have yellow specks been visible upon the tonsils. The contents of the vesicles have in the latter stages of the complaint, been turbid, and approaching to pus. When a vesicle has been broken, and the fluid escaped, the portion of the cutis answering to the size of the vesicle, has been exposed of a dull red or vivid-red color, according to the stage of the complaint,

Varieties in
this eruptive
disease.

Characteristic
mark of the
disease.

but without any adhering lymph, the contents of the vesicle, when the cuticle is once broken, being easily wiped clean away.

Reasons for
not assigning
it to the var-
iolous conta-
gion.

I have never met with these eruptions rising into large pellucid vesicles, in those families where others had the small-pox, but it seems to maintain its own character in being communicated from one individual to another. I have not witnessed the progress of this eruption in any child which subsequently had small-pox, although I have reason to believe that such an event has occurred ; but I vaccinated two children with perfect success shortly after I had seen them with this disease, which in both of them left several light-coloured scars upon the abdomen, shoulders and arms, and even upon the thighs. I watched every step of the disorder in a boy who had within six weeks recovered from the small-pox, and whose body was still marked with the plum-pudding spots from a numerous burthen of that eruption. It appeared to be very contagious, every child in the few families which I attended with it, being attacked, whilst parents, who probably might have had it formerly, remained unaffected by it.

I drew up this description from the notes I took of the cases that occurred to me, without reference to the opinions of authors upon these

complaints, and as I shall subsequently have occasion to show that I have since not neglected these, I leave it without alteration or addition.

SECTION III. *Of the eruptive Diseases which have chiefly occurred in those who had passed through the cow-pox.*

None of these complaints having proved fatal, and many of them being so slight as to have been regarded very naturally as chicken-pox, they would be undeserving of the time and attention which I mean to give to them, were it not necessary to shew the relation which they seem to bear to each other, by presenting a detailed account of a whole series of them, beginning with the mildest and concluding with the most severe. I rather mean to state that they have chiefly occurred in the vaccinated, than to aver that they have in no instance been met with in those who had passed through the small-pox. In an adult, who formerly had small-pox by inoculation, an eruption came out upon the face, arms, trunk, legs and hairy scalp, in the form of small dull-red spots, elevated and perceptible, to the touch, which in 36 hours, rose into minute vesicles, pointed at the top. On the fourth day, those on the face were full of pus, whilst the rest contained an opake fluid. The day following they all dried into irregular scabs. Two or

These eruptions not strictly confined to the Vaccinated.

three days of fever had preceded the eruption, with vomiting, and severe pain in the head and back, foreboding, to all appearance, an eruptive disease of a more serious character. Other professional gentlemen inform me of their having seen similar cases in those who formerly had the small-pox; and one upon whose opinion I have great reason to rely, and who has given much attention to the subject, assures me that he observed an eruption possessing the indented character, like many of those which I am about to particularise, in a child, which afterwards, in the course of the summer, had regular small-pox.

In the months of April, May and June, I repeatedly met with patients suffering from fever and sore throat, with a rash upon the limbs and chest, which, from some circumstances, there was ground to suspect proceeded from the variolous contagion. More frequently, after a day or two of indisposition, pimples appeared, in the centre of which conoidal vesicles arose in 24 or 48 hours, filled with a clear lymph, and shining like diamond. These never attained any considerable size, seldom $\frac{1}{12}$ of an inch in diameter. Their contents became turbid and often purulent, and on 4th or 5th day they dried into irregular rough small scabs without having at any time been flat or indented. These vesicles, though small and crystalline, were not so

Rash and
sore throat.

Conoidal Ves-
icular Erup-
tion.

delicate as to be often broken, although they sometimes burst at the period when incrustation was commencing. These occasionally occurred in the same family, where other children laboured under a disease of a severer character and longer duration.

The most important of these eruptive diseases have consisted of pocks presenting the indented character, and these I shall endeavour to explain by selecting such a number of cases as will embrace the principal varieties I have witnessed, as to the previous symptoms, and the quantity, size and duration of the eruption.

Eruptions
with indented
Pocks.

C A S E I.

Five children composed one family, all of whom were vaccinated when infants, and at different times had an eruptive disease which the Physician who attended called the water-pox.

After complaining of head-ach and loss of appetite for two or three days, Master ——— the second son, observed a rash upon the thighs and arms. The next day he had soreness of the throat, and a few pimples made their appearance upon the face, limbs and body.—*3rd day.* The eruption assumed a distinct form, six

Rash, preced-
ing the erup-
tion of a few
indented
pocks.

or eight pocks occupying each arm, as many appearing upon the face, and still fewer upon the body and lower limbs. The rash gone. Most of these pocks were perfectly circular, characteristically indented in the centre, in general about $\frac{1}{12}$ of an inch in diameter, and having exactly the same appearance, as to shape, as the natural variolous pocks on the fifth day of the eruption in a child which I visited a few hours afterwards. Master _____ had now very little indisposition, and had never been confined to his room. His throat was sore, with one or two circular white specks upon each tonsil, and several similar ones upon the posterior fauces.—*4th day.* Many of the pocks enlarged to $\frac{1}{8}$ of an inch in diameter, some being still indented in the centre, others never having been so, and others having lost it by becoming convex on the surface. The contained fluid, which was yesterday limpid, is now turbid. I let out the contents of one of the largest pocks and find them wheyey. To do this, I am obliged to break it up with a needle, as the fluid would not escape through a single puncture, the pock consisting of separate cells. On entirely removing one of these pocks, a little lymph was found adhering to the cutis to the extent which the pock had occupied. The red circle at the circumference of these minute

pocks is so slight as not to be discoverable by the naked eye, though evident when a magnifying glass is employed.—*5th day.* Most of the eruption dried into circular, regular and slightly convex scabs, and not into irregular crusts nor pyramidal masses with rough surfaces. One pock upon the wrist, which yesterday was indented, is now convex upon the surface and of a pearl-colour. I let out the contents with a needle, and what first flows is clear lymph, the pearl-colour being owing to a wheyey and tenacious fluid occupying the basis. Specks still visible on tonsils and posterior fauces.—*6th day.* The throat well; two or three of the pocks not yet dried up.—*10th day.* All the crusts gone, and no remains of the disease observable.

Two of the other children had an eruption of a similar kind, in one of them lasting to the 6th day, in the other drying up completely on the fourth, some of the pocks in each presenting an indentation, whilst the rest rose as small, pellucid and conoidal vesicles. The eldest of the family, aged 14 years, and the youngest, aged 4 years, had neither illness nor eruption.

Numerous instances of a mild eruptive disease like the preceding have come under my observation, which I did not deem it advantageous to note at any considerable length.

CASE II.

LAKE's child, aged $8\frac{1}{2}$ years, was vaccinated when an infant, and has one circular and foveolous scar upon the right arm. He began to complain on *Thursday, 10th June*, and was for two days delirious. The symptoms abated on *Sunday, 13th*, when an eruption appeared on the forearm.—On *Monday*, as he was able to go about, and had only a few pimples on different parts of the body, I made no particular examination of him. *Wednesday, 16th*, the eruption upon the face is pustular, consisting of about 20 pocks. Upon the forearm there are 8 or 10, some of which are flat, circular and indented in the centre, and filled with a clear fluid. A few on different parts of the body are of a pearl-colour, and slightly convex. Yellow specks upon each tonsil. Compared with a very mild case of distinct regular small-pox, that had just advanced so far as to lose the indented character, this eruption presented pocks of the same figure, and about half as big. *Thursday, 17th*, the eruption on the face is filled with yellow pus. In other parts, the pocks have lost their flat and indented shape, are become convex, and are mostly of a pearly appearance. One of the largest of these, situated upon the back of the hand, is about one-fourth of an inch in diameter, and, on breaking it up with a needle, I find that

Pearly and
indented
Eruption, pus-
tular on the
Face.

an almost transparent fluid first flows out, whilst the material to which the pearly hue is owing remains behind, adhering firmly to the basis of the pock. The specks have disappeared from the tonsils.—Saturday 19th. The eruption upon the face and hands is dried into crusts, some of which are small and pyramidal, but the larger ones are flat, solid and circular. Two or three pocks upon the arms are not incrusted. I let out the contents of the largest of these, and find them like whey, with lymph firmly adhering at the bottom. I remove some of the crusts from the face, and observe a convex surface, with a pit in the centre, and detachment of the cuticle at the circumference.—Monday 21st. (*ninth day of the eruption.*) Almost every crust is separated leaving scarcely the trace of a blotch behind, save a slight indentation in the centre of some of the spots to which the scabs adhered. The pocks in this case were hard to the touch, none of them were injured by rubbing, and none had any obvious areola surrounding them. The child, from the completion of the eruption, walked about in health.

Another child in this family, vaccinated 7 years, had a similar eruption. Three others, vaccinated at the different periods of 10, 7 and 3 years, and an infant vaccinated by me within

a few months, had no illness, nor eruptive disease during the epidemic.

I have frequently had occasion to witness such examples as the above, in consequence of their having some resemblance to small-pox, and have selected it and the two following from notes of more than thirty cases, which present so little variation as to induce me to suppress the remainder.

CASE III.

HAYDEN's family consisted of 8 children, one of which had the natural small-pox formerly, and the remaining 7 had been vaccinated at different times, from 7 years to a few weeks. One of the vaccinated furnished the short history which follows:—His age is 10 years, and he was vaccinated 6 years ago, in consequence of which he has now one fine indented scar on the left arm. On Tuesday 8th June, after three days of severe indisposition, a few red spots appeared in the evening upon the abdomen, and the next day many were visible upon the face and other parts of the body. In 48 hours these presented very minute pocks, indented in the centre, whilst spots more recently come out were pimples or pyramidal vesicles. On the 5th day of the eruption, there were between 50

Eruption
with indented
pocks and
slight swelling
of the face.

and 60 pocks upon the face, which was scarcely swollen ; and the pocks were equally numerous upon other parts of the body. I observed a majority of them to be perfectly circular, flattened upon the surface, and indented in the centre. No interstitial swelling nor redness around the base. The circular and indented pocks so exactly resembled those which I observed the same day in an infant with natural small-pox, that I could not perceive the slightest difference as to shape, colour and size ; but the progress was remarkably different, the eruption in the infant advancing in size for 4 or 5 days more, producing a fatal termination when incrustation was about to commence, whilst in this boy, who had little indisposition from the first appearance of the eruption, every pock incrusted on the following day, save 2 or 3 upon the eye-brow which were pustular, and a few upon the hands of a pearly appearance and slightly convex surfaces. The fluid let out of these was of a colour and consistence resembling whey. In two days more, many of the crusts had fallen off, leaving upon the face circular and somewhat convex elevations of the cutis.

Another child, aged 6 years, came out, ten days afterwards, with an eruption that put on the same appearance. All the rest of the family remained free from disease.

CASE IV.

Eruption
leaving slight
tubercular
elevations.

A boy, aged 7 or 8 years, was vaccinated when an infant, and has a scar upon one arm. After the customary indisposition, he shewed an eruption, which on the 5th day was thinly distributed upon his face, arms and thighs; some were circular, flat and indented; some very minute and of a conoidal shape; others convex and assuming a pearly hue. The largest of these were not $\frac{1}{8}$ of an inch in diameter. Some fresh ones reported to have come out on the 4th day. In two days more, every pock was dried into regular small crusts, which all fell off within four days, the largest leaving slight elevations or tubercles scarcely distinguishable in colour from the surrounding skin. No appearance of pits. This was a patient of Mr. Gowing's; and the trifling indisposition, irregular rapid progress of the eruption, and small dimensions of each pock, made it fully entitled to the name of *varicella*. Notwithstanding these circumstances, clear lymph taken from some of the pocks before they had ceased to be indented, produced the following effects by inoculation.

CASE V.

A boy, aged $4\frac{1}{2}$ years. Matter taken from the preceding case, was inserted by Mr. Gowing

on Thursday, 10th June, two incisions being made in one arm, and one in the other. The incisions inflamed on 3rd and 4th days, each gradually rising into a regular pock.—On *6th day*, fever commenced, preceded by sickness and vomiting. Next day, an eruption began to come out in different parts of the body.—On *10th day*, the three pocks from the incisions on the arms were surrounded by extensive areolæ, and looked very like vaccine vesicles of the same date, but not quite so regular at their margins. The general eruption, the earliest of which has been out three days, has a varied appearance. Ten or twelve pocks are situated upon the face, and upon the rest of the body, they are equally sparingly distributed. Some are little pimples, in the centre of an inflamed spot of cutis. Some are pocks circular, flat and indented, not exceeding $\frac{1}{8}$ of an inch in diameter. A few resemble small and prominent vesicles. An areola half an inch in extent surrounds some, whilst the circumference of others presents only a minute red circle. Soreness of the throat complained of. On *15th day*, (9th of the eruption.) The pocks upon the face are dried into regular scabs. On the hands and arms they have not begun to incrust, being of a circular shape, convex on the surface, and mostly surrounded by a florid-red

First exper-
iment by ino-
culation.

circle, about one line in width. The diameter of these pocks upon the arms varies from two eighths to three eighths of an inch. The contents of some I found to resemble laudable pus; others contained a thick muddy fluid. There have been four or five pustules upon the head. A yellow speck or two is perceptible upon each tonsil. There is less of the eruption on the body and lower limbs, and the pocks in these situations are not nearly so large as upon the hands and arms. The three inoculated places are of an irregular shape, and not yet dried into scabs.

Hitherto the boy had kept about since the eruption first came out, but the day after the foregoing report, he was very ill with fever, which lasted 24 hours, and confined him to his bed.—On 18th, *day of inoculation, (12th of eruption,) all was scabbed, the inoculated places shewing large crusts, two regular in shape, and one irregular. Upon the face and lower limbs the scabs are small; but, upon the wrists and arms, several are as large as the vaccine scabs in an infant, and like them in shape, being circular, thick and convex. Some are surrounded with a ring or elevated ridge of cutis, such as occurs occasionally around the vaccine scab, or as we sometimes meet with in mild cases of small-pox. The parents would not allow this.*

boy to be subsequently inoculated with variolous matter, but he was continually exposed to small-pox, for several months after his recovery, without receiving any injury. A sister of his, vaccinated 7 years ago, did not take any disease from him, although continually by his side during the progress of the eruption produced by the inoculation.

The effects of this experiment surprised me, the appearances being so different from those in the individual from whom the matter for inoculation was taken, for whilst the pocks were actually less numerous, the indisposition was more severe, the eruption remarkably larger, and the complaint more than doubled in duration.

C A S E V I.

The second inoculation from case 4 was performed upon a child $3\frac{1}{2}$ years of age, one incision being made in each arm on Thursday 10th of June. On the 3d and 4th days, the incisions inflamed, and took the same course as in the preceding case, but with rather more areola and inflammation.—On *6th day* of inoculation, the child became feverish, and sick unto vomiting.—On *10th day*, the eruption began to appear as small red spots, and on the following day, a minute pimple was perceptible in the centre of

Second experiment by inoculation.

some of them.—On 15th day (being the 6th of eruption,) the pocks had advanced the same as in the preceding case, being most abundant on the face. Some have an indentation in the centre, and are filled with a limpid fluid ; others have lost the indentation, having become slightly convex, and being filled with a turbid fluid. The largest of the pocks are not above $\frac{1}{4}$ of an inch in diameter, and all of them are surrounded by a red circle. A yellow speck or two observable upon the right tonsil.—On 18th day, (9th of eruption,) almost every pock has dried up since yesterday into scabs of a circular shape, the largest being about $\frac{1}{6}$ of an inch in diameter. Two upon the fingers are not yet dried, and these contain turbid lymph, not pus. Three or four pocks upon the feet also still contain fluid. This case being mild, with very few pocks, every one was incrusted on the 10th day of the eruption, and no secondary fever was perceptible. This child was afterwards exposed to the small-pox repeatedly, without receiving the infection. Two elder children in the same family, who had been vaccinated several years, were unaffected by the disease produced from inoculation in this and the following case.

CASE VII.

Lymph clear and colourless was taken from

one of the pocks upon the wrist of case 6, and inserted into each arm of an infant in the same family on Thursday 24th of June. In three days, a pimple was observable upon each arm, shewing the inoculation to have taken. When four more days had elapsed, this infant was taken ill and continued so for a day or two. The inoculated places advanced regularly as in the first and second experiments, rising into large pocks and drying up in 12 or 14 days, a few pimples only appearing around them, without any general eruption over the rest of the body. Subsequent inoculation with genuine variolous matter was not permitted, but this infant, like the rest, resisted frequent exposure to the small-pox, which was in the house of its next-door neighbour, whom it frequently visited.

C A S E VIII.

This case, already alluded to, (p. 35,) was one of 57 subjects formerly vaccinated, who were exposed to the contagion of small-pox in the same room. The child was the youngest of a family of three children. The eldest, vaccinated 14 years ago, shewed one large foveolous scar upon one arm, and escaped all eruptive disease, although she waited continually upon her sisters during their illness. The second had

Numerous
eruption of
indented
pocks accom-
panied by a
rash.

been repeatedly vaccinated without any effect, and fell down with the natural small-pox in the beginning of May, which proved dreadfully severe, lasting nearly a month, and leaving the whole frame disfigured by scars. When this girl recovered, and when the scabs were falling off, the youngest child, (vaccinated five years ago, and having a small indented scar upon one arm,) came out with a rash on the *5th of June* after two days' illness. On the *7th*, large red patches, not unlike measles, were observable upon the arms, neck, and upper part of the thighs, and in these situations I already distinguished numerous small vesicles, flat upon their surfaces, and depressed in their centres. Clusters of similar vesicles occupy the face, and different parts of the body, the distribution of the eruption being very unequal and irregular. On the *8th*, fresh vesicles have arisen in those parts before unoccupied. The rash is faded. The original pocks increased in size, but still not above $\frac{1}{12}$ of an inch in diameter, flat and indented. Upon the shoulders and trunk, the cuticle is raised, in irregular bags or cavities, filled with air. On the *9th*, many of the pocks are plumped up since yesterday, and changed from flat to convex; those upon the face look pustular. The child has hitherto been considerably ill, and now sits up. Eye-lids slightly

tumified, but no interstitial swelling in the face or other parts of the body.—On *the 10th*, the eruption, without having become pustular, except upon the face, is drying rapidly, into small flat, slightly convex scabs, less than $\frac{1}{2}$ of an inch in diameter. *11th*, all the pox dried up, some spots upon the trunk, which contained little fluid, leaving no crusts; others that were small and pyramidal vesicles, leaving crusts of an irregular shape; whilst the largest proportion, which were circular, flat and indented at a certain period, have formed regular scabs. Some of the crusts first formed are already fallen off. *13th*, many of the scabs fallen off, particularly from the face and arms, leaving small elevations of the skin of a dull-red colour. *16th*, all the crusts separated; the warty elevations of the cutis in the situation of the crusts which first fell off are less prominent, and around them is a circle of detached cuticle. *22nd*, the elevations of the skin are nearly absorbed. Blains are still discoverable where the scabs were situated; they leave a shining appearance, and are about $\frac{1}{3}$ the size of those in her sister, who suffered so severely from the natural small-pox. These two cases, indeed, occurring in the same family, the one immediately after the other, formed a striking contrast, the child which had formerly had the cow-pox having in many parts

of the body *as great a number* of pocks, yet going through the disease in half the time, without danger or detriment, a few very minute pits upon the tip of the nose being the only permanent traces of the effects of the disease. Several cases which I have witnessed, precisely similar to this, where the pocks were very numerous and small, have been significantly styled *the pins'-head small-pox*. The small circular blotches disappeared in three-weeks, whilst in her sister the blotches were evident for as many months.

On the 5th day of the eruption in the above case, I armed several points with matter from one of the pocks upon the leg, with which a child was inoculated a few days afterwards. The effect was, that a vesicle rose upon the arm with a rash upon several parts of the body, all of which disappeared in a few days, without any general eruption, and this child, in the course of the summer, caught the small-pox, of which it died. This imperfect effect of the inoculation I attributed to the matter being turbid when taken, (incrustation being just commencing on the face,) and to its not being immediately used.

C A S E IX.

RESTOW's family consisted of 7 children. The infant I recently vaccinated, and the rest

had been submitted to that process at different times, from 2 to 8 years. The second child, having one fine foveolous scar from the cow-pox, after two days' illness, came out with an eruption on the 3rd of June, the early progress of which it is superfluous to detail. The pocks became abundant all over the body, particularly upon the face, arms and legs. On the 5th day the general appearance of them was numerous vesicles, close to, and yet distinct from each other, some convex on the surface, a few flat and depressed in the centre, and upon the thighs intermixed with several irregular bladders of the cuticle distended with air. The eyelids a little swollen, and in the evening of this day, all the eruption on the face pustular. On the 6th day, incrustation complete upon the face. The contents of the largest pocks on the rest of the body are turbid, not purulent, and none exceed $\frac{1}{8}$ of an inch in diameter, except the few irregular elevations of cuticle distended with air. There is no red circle surrounding any of these pocks, which are firm, circular and distinct. On the 7th day, incrustation completed on the arms and most other parts of the body, but a few pocks upon the legs furnish a little turbid fluid, with which two children who never had small-pox were inoculated without any effect. In three days more, all the

Eruption of
numerous
pocks, a few
only indented

scabs fallen off, without scar or detriment. The eldest girl in the family, aged 9 years, was attacked, before her sister's disease was completed, with slight indisposition, succeeded by an eruption of 30 pimples, many of which dried on the fourth day, and all were incrusted on the fifth, a few on the wrists having presented the circular form and central indentation, whilst the rest were small vesicles containing very little fluid. The five younger vaccinated children had no eruption:

I contrasted case 9, where the pocks were not less in number than 7 or 8 hundred, with a particularly mild case of natural small-pox in a child near by, having about 50 pustules. The pocks on the face in this child were beginning to incrust at their apex on the 5th day, but the incrustation on the face was still not completed on the 7th day, at which time the pocks on the rest of the body were $\frac{3}{8}$ of an inch in diameter, with a red margin surrounding each, and a small crust beginning upon the centre of some of them. In case 9, on the contrary, many scabs were fallen off by the 8th day, and the largest of the pocks did not exceed $\frac{1}{8}$ of an inch in diameter.

C A S E X.

BRAZELL has a family of 6 children. The infant has been vaccinated 8 times without

effect; the remaining 5 have had the cow-pox at different dates from 3 to 7 years. One of these 6 children only had any eruptive disease during the epidemic. He was vaccinated 7 years ago, when 5 years old, and has an indented scar upon one arm. In June he was very ill for two days, and was relieved by the appearance of an eruption, but still continued so indisposed as to keep his bed for three days longer. On the *5th day* of the eruption, the pocks, (most numerous on the face and hands,) were in some parts flat and indented, in others convex. I told 50 upon the face, varying from the size of pins' heads to that of a small pea. Next day, many were incrusted, but on the *7th day*, several on the face and hands were filled with yellow pus. From the time that all the eruption was out, the boy became well in health, but it is curious that those vesicles which came out last, were the first to fade, and dry into small crusts, without becoming pustular, whilst the pocks on the forehead, which shewed themselves most early and attained the greatest size, becoming full of pus, were the last to incrust. On the *11th day*, most of the scabs separated, leaving convex elevations of the cutis, bounded by a detached circle of the cuticle. Neither in this nor in any of the other families, in which the cases related in this section occurred, did the parents receive any eruptive disease from nursing their children.

Eruption of
indented
pocks, becom-
ing pustular
on the hands
and face.

C A S E X I.

CRANE, aged 18 years, and vaccinated 16 years ago, from which a scar remains upon one arm, had an eruption of several hundred pocks in May, which took the course described in preceding cases, presenting in some the indented character on the 3rd and 4th days, whilst others were convex, oval or irregular. On the 6th day, most of the eruption incrusted, the scabs falling off in a few days, and leaving in many parts slight elevations. But the pocks upon the face on 5th and 6th days, instead of incrusting like those in other situations, seemed to have their contents at once coagulated, and thus to be converted into firm tubercular tumors, which were subsequently removed by absorption, without leaving any permanent scars.

C A S E X I I.

A boy, in the same family as the preceding case, aged 15 years, and vaccinated 12 years ago, from which he has one perfect scar, came out with an eruption on the 24th of May, after suffering from head-ach and fever for two days.—*2nd day of the eruption.* The pocks most abundant upon the face, and small flat and indented vesicles already visible. *4th.* He is still ill, the face a little swollen, and the pocks

Eruption with
indented
pocks visible
on the second
day.

there running into each other. Those upon the extremities are now distinct and indented. Some are situated upon the edge of the tongue, as well as upon the tonsils.—*6th.* The eruption was yesterday pustular upon the face, and has begun to incrust. He is free from headache and fever, and able to go about.—*7th.* All the pustules upon the face are dried into pale regular crusts. Upon the extremities, those pocks which did not suppurate are also incrusted; others, which became filled with a muddy or purulent fluid, are still prominent. There is no red circle to be perceived around even the largest of them.—*8th.* A few pustules upon the hands and legs are not yet incrusted, although some of these came out on the second day of the eruption; these are firm to the touch, nearly spherical and scarcely exceeding the size of a coriander seed.—*10th.* Incrustation complete, and the scabs generally circular and flat.—*12th.* Many of the scabs are fallen from the cheeks, leaving elevations the color of the surrounding skin. Many have also separated from other parts of the body, but mostly without leaving any tubercular prominences.—In three days more, all the scabs were detached, and scarcely any trace of the disease to be perceived. It may be remarked, that the febrile symptoms in this case were not removed on the first appearance

of the eruption, continuing three or four days afterwards ; and that none of the pocks much exceeded the size of a coriander seed.

Two children in the same family, one vaccinated five years, the other one year, had a few spots which dried up in four days, without being preceded or attended by any indisposition. Five others, having each only one scar from vaccination performed at different dates of 16, 12, 10, 7 years, and 1 year, frequented the same room without contracting any disorder.

CASE XIII.

In STARKEY's family the eldest child formerly had the small-pox, and 5 others were vaccinated at different times from 3 to 10 years. One of these five, aged eleven, had an eruption of 20 or 30 spots in the latter end of June, which lasted only 4 or 5 days, and produced so trifling an inconvenience that I was not requested to examine it. A week afterwards, another girl, vaccinated 10 years, and having one tolerably indented scar on the left arm, after suffering from slight indisposition for four days, was seized with vomiting on the 13th of July, attended by much fever and a very foul white tongue. Fortwenty-four hours, everything taken into the stomach was rejected. On the

Eruption of
indented
pocks, a few
attaining a
large size.

evening of the 14th, an eruption was first observed upon the hands, consisting of minute red specks; and the next day, a similar appearance presented itself upon the face and limbs.—16th. The fever is less, and the stomach retains what is taken, but the tongue is still loaded with a white fur. The eruption is most abundant upon the face, arms and hands, and rare upon the trunk and lower extremities. In some places, the pocks are coherent, but they are mostly distinct, consisting of minute circular vesicles, indented upon the surface, and filled with a clear fluid. The throat is sore.—17th. Most of the eruption has lost the indentation, and become convex upon the surface. There is a rash upon the face in addition to the pocks, and the eye-lids are a little tumesfed. The largest pocks are about $\frac{1}{6}$ of an inch in diameter. Upon the trunk there are some elevations of the cuticle of a very irregular shape, distended with air, and containing very little fluid.—19th. On the face the pocks have assumed an irregular shape, and some are half an inch in their greatest diameter, convex on their surfaces, and distended with fluid of a purulent appearance, at the same time that the smaller ones have begun to incrust. Tumefaction of eye-lids gone. Some pocks upon the arms are $\frac{3}{10}$ of an inch in diameter, convex and circular, without

surrounding redness or swelling ; none of them are of a yellow appearance, but the smallest are filled with a transparent, the largest with a milky fluid. Upon the trunk and lower limbs the eruption has advanced very little, the pocks remaining small, and many of them empty, flaccid or not fully distended with their contents. The tongue is quite clean, and the fever gone.—21st. The eruption upon the face is dried into light colored scabs. Incrustation has also partially taken place on the arms. Most of the pocks in other parts, contain an opake fluid, in some wheyey, in others approaching to pus.—22nd. Incrustation every where completed.—24th. Every scab is separated from the face, leaving tubercular elevations ; from the arms they are also separated, circular blotches remaining with shining, slightly convex surfaces, crowned at the circumference with a circle of detached cuticle.—27th. Elevations of the cutis are still visible upon the cheeks, but hardly perceptible to the touch. Circular blotches continue upon the arms, and in the centre of some of them an indentation is observable, corresponding to that of the pocks. No scars were ultimately left by this disease, except one or two upon the face where the patient picked them.

On the 31st of July, a younger child in this

family came out with a few pocks, accompanied by sore throat, and ending in small irregular crusts on the 5th day, without having at any period of their progress presented an indentation upon the surface. The remaining three children had no eruptive disease.

CASE XIV.

PROWEN, a young woman 17 years of age, was vaccinated 14 years ago. One vesicle only rose, from which other children were vaccinated and a strong scar remains upon the left arm, having a shining surface without foveolæ. After two days of indisposition, a few red specks appeared upon the nose and the arms, on the *19th of July*. The following morning they were observable upon different parts of the body, and fresh ones came out for two or three days.—*23rd*. The eruption so abundant upon the face, that the pocks run together, and the cheeks and eye-lids are swollen, though not so much as to prevent vision. Upon the hands and arms the pocks are also very numerous, being mostly circular and indented in the centre. They vary in size from $\frac{1}{12}$ to $\frac{1}{6}$ of an inch in diameter. The fingers are most abundantly studded with pins'-head vesicles. Upon the trunk and lower limbs; the eruption is of a

Most numer-
ous eruption
of indented
pocks.

different character, presenting pimples and irregular vesicles, with scarcely a perfect and indented pock.—25th. Upon the face, the form of the eruption is very irregular, the pocks running together, and appearing of a bright yellow color; slight tumefaction continues. The pocks on the arms are convex; on breaking up one of them with a needle, I find a transparent lymph first escaping, and afterwards a flaky or turbid fluid. Elsewhere the eruption is various, presenting red specks, pimples, irregular vesicles filled with air, and a few circular indented pocks.—26th. Upon the face many pocks are incrusted. Upon the fingers they are dried into minute, pin's head scabs, of which I reckon as many as *sixty* upon the middle finger of the left hand, every scab being solid, flat, circular, distinct and scarcely more than $\frac{1}{16}$ of an inch in diameter. Upon the back of the same hand, I reckon *one hundred* pocks, most of them distinct, a few coherent, and all distended and prominent with their fluid contents. Upon the arms some are become of an oval or irregular shape, whilst others continue circular; the fluid contents first evacuated from one of them are still transparent, a flaky substance being pressed out at the last. The eruption upon the trunk and lower limbs is quite of a different character, the pocks containing little fluid, and being

intermixed with bladders of opake cuticle filled with air.—27th. The eruption upon the face is chiefly dried into scabs of a light colour. Many upon the arms are dried into dark circular flat scabs; the contents of some upon the arms are still clear, of others turbid and almost purulent, but the pocks here are pearly, and have not the yellow appearance which those had upon the face. I dissect one of the largest of them, and after cutting away all the elevated cuticle or cyst, I find the cutis of a red colour, with opake lymph firmly adhering to it, which is with difficulty removed. Some pocks on the chest and lower limbs contain a wheyey or dirty fluid, but a vast majority do not advance at all. None in either of these parts are yet scabbed, save a few near the soles of the feet, which are converted into minute scabs, like those upon the fingers. Some of the eruption upon the hairy scalp is converted into imperfect crusts.—28th. Incrustation complete upon the face. Many upon the arms are not dried, but become flaccid, part of the contained fluid having been evaporated or absorbed.—29th. For the last three days, the patient has left her bed, and been well in health. Many scabs separated from the face, leaving it rough with numerous elevations of the cutis. Incrustation complete upon the arms. A few upon

the neck and legs still contain a turbid fluid; these are the size of pins' heads, and look like small pearls.—*August 1st.* A few crusts only formed upon the neck, chest and lower limbs, the rest of the eruption never having come forward.—*4th.* Upon the arms, hands and feet, numerous small scabs still remain.—*8th.* The face has nearly recovered its former look, and no pits are perceptible. The forearms are nearly free from scabs, which, on falling off left shining surfaces, of a redder colour than the surrounding skin. The crusts still remain upon the hands, dark, circular and indented in the centre. They are very numerous upon the fingers and palms of the hand, and are situated beneath the thick external layer of the cuticle, which binds them down, as it were, and prevents their separating, and some of them have excited festers, by which the dense cuticle is broken, and thus the scabs are removed. Some scabs remained several days longer until the thick cuticle was worn away, and were thus the last marks of the disease.

Contrast be-
tween this
case and re-
gular small-
pox.

To a case of mild and distinct small-pox this obviously bore no close resemblance. It can only be compared to one in which the pocks come out in great abundance, and here the differences are too striking to be overlooked. A patient with such a plentiful variolous eruption

as to present a hundred pocks upon the back of one hand, would have a disease of three weeks' duration, blotches visible for five or six months, and numerous scars for the rest of his life ; tumefaction of the face, closing the eyes, would unavoidably occur for some days, and be followed by a similar swelling of the hands ; the pocks in the progress would become confluent in many parts, and where the pocks did not occupy the surface, there would be redness and interstitial swelling. All these effects were absent in the instance just detailed, and, keeping our view upon a case of small-pox with an eruption equally numerous, we have the additional distinctions of no fever of suppuration or scabbing, no red circle around the largest distinct pocks, and no offensive variolous fœtor from the scabs. Whatever, therefore, was the source of this eruptive disease, nothing can be more clear to the reasoning and enlightened practitioner, than its differing remarkably from a case of regular small-pox.

This patient referred her illness to having been exposed to the small-pox a few days before her indisposition. Seven of her brothers and sisters lived in the same room with her, and caught no infection ; the eldest of these formerly had the small-pox, and the remaining six had been vaccinated from 16 years to a few

weeks, none having more than a single scar upon one arm.

To abbreviate as much as possible the history of these cases, I have omitted the treatment. No local treatment being required, the curative means were such as the accompanying febrile symptoms suggested, and which were in every one of the preceding instances, and in almost all others that I met with, a foul white tongue, head-ach, strong rapid pulse and increased temperature of the skin. The only exceptions to any of these characters of the fever attending the eruptive diseases in question, occurred in the examples which I have yet to subjoin.

General character of the fever attending these eruptive diseases.

CASE XV.

A young gentleman, nearly 20 years of age, was vaccinated in his infancy and was one of the earliest upon whom the operation was practised in Norwich. His grandmother resisted small-pox entirely throughout life, and his mother had only a local pustule produced by inoculation, without any general eruption.

Numerous indented pocks with fever of a typhoid character.

A few weeks after the vaccination he was inoculated with variolous matter, and the same experiment was repeated when he was two years old. A scar, small and indented, not bigger than a silver penny, remains from the

vaccination ; and above it, upon the same arm, there is a shining cicatrix, big as a sixpence, produced by the ineffectual insertion of the variolous matter.

Saturday, 10th July. This young gentleman complained of being ill in the afternoon, and was the next day so indisposed as to be unable to go about. *Monday, 12th.* He had much fever, and, on account of his feeling pains in his limbs and a remarkable degree of prostration of strength, it was feared to be the commencement of typhus fever, which had been amongst the servants of the family some weeks before. *Tuesday, 13th.* He is excessively anxious and restless, confined to his bed, and so apparently exhausted as to be unable to hold up a limb for a few seconds. He complains of distressing head-ach and thirst ; pulse rapid ; tongue brown and dry ; vomiting. A moderate bleeding was recommended, and I found the blood drawn very sizy. After he had been well purged, the vomiting ceased. On the evening of this day, an eruption, consisting of a few very minute red specks, began to appear upon the hands. *Wednesday, 14th.* The eruption of small red specks has taken place upon the face, arms and several other parts of the body. The pulse is soft and less frequent ; the anxiety and restlessness much relieved ; some head-ach

remaining; tongue less dry, yet still covered with a brown crust. *Friday, 16th.* Minute, flat and very indented pocks could yesterday be perceived in the centre of many of the specks, and to day they are very numerous. Upon the face and hands, they are in clusters; in other parts of the body they are distinct and very abundant. The tongue is no longer brown; head greatly relieved, and anxiety and langour nearly gone. *Saturday, 17th.* The patient sits up, and is in a still better state of feeling. The eruption has, within these 24 hours, undergone a most surprising change. Upon the face it is pustular, consisting of numerous yellow pocks clustered together, and in some places running into each other; the largest are acuminate at the top with beginning incrustation, having entirely lost their circular shape and indented appearance. The face is slightly swollen, yet not so as to close the eye-lids, nor to prevent vision in any degree. Upon the hands and fore-arms, where the eruption is most abundant, a few are become convex, but the greater proportion continue circular, indented in the centre and filled with a transparent fluid. A single hair occupies the centre of some of them. The largest of these regular pocks are not more than $\frac{1}{8}$ of an inch in diameter. Upon many parts, the eruption still appears as circular dull-red spots beneath the

cuticle, without any prominent vesicles being raised in the centre of them. Upon the trunk and lower limbs, where the eruption is least abundant, these specks in the room of pocks or vesicles are in the greatest proportion. *Sunday, 18th.* Half of the eruption upon the face is dried into scabs of an irregular shape, the rest continuing pustular. Most of those upon the hands and wrists are formed into small, circular, dark-coloured scabs, more numerous than in the preceding case, several hundreds being upon each hand. Upon the upper-arms and trunk, some of the vesicles are empty, as if the contained fluid had evaporated or been absorbed, leaving inflated bags of opake white cuticle. The largest pocks upon the arms are now convex or spherical, not exceeding $\frac{1}{6}$ of an inch in diameter, some being filled with a muddy fluid, but none with true pus. Upon the lower extremities, a very few pocks are interspersed amongst an immense number of small circular blotches, which never have risen into vesicles. Similar blotches exist upon the trunk, and even upon the fingers a few fill up the space between some of the scabs. The patient sits up all day at the window, and enjoys the fresh air. Although there has been very little complaint of soreness of the throat, I observe a few small, yellow, circular specks upon the right tonsil and

posterior fauces. *Monday, 19th.* All the eruption on the face is dried into irregular crusts, none of which are flat and circular. A few pocks still remain prominent upon the arms, from which I evacuate a brownish turbid fluid by a puncture with a needle. Between 300 and 400 flat circular scabs adhere to the hands, varying from $\frac{1}{12}$ to $\frac{1}{8}$ of an inch in diameter; on the fingers and palms of the hands they are visible through the dense cuticle, which requires to be removed before these scabs are laid bare and exposed. A few pocks upon the lower limbs still contain a turbid fluid, and some upon the trunk are not yet incrusted. It may be again remarked that none of the pocks became filled with yellow pus, except those on the face. He sits up comfortably; tongue moist, but not quite clean. *Tuesday, 20th.* Almost every scab is separated from the face, in less than seven days from the eruption first appearing in that situation; the cuticle falls off in scabs from the whole surface, and the cheeks are mounted with slight tubercular elevations, firm to the touch, and redder than the surrounding skin. A minute pock still remains here and there upon the arms, filled with thick and almost purulent fluid, in the midst of numerous crusts, many of which are separated, leaving dull red blotches without any elevations of the cutis.

Upon the trunk and lower limbs there are very few regular scabs, and no pocks containing fluid.

Wednesday, 21st. From the face every crust is separated. A few still adhere to other parts, from the pocks which last incrusted, and also to the fingers. The tongue is quite clean and healthy ; he calls himself well, except that he has a feeling of giddiness in the head on making any exertion.

Friday, 23rd. He walks out daily. The face is clear, but slight elevations of the cutis still remain. The scabs are detached from all parts, save the fingers and palms of the hands, to which a few, not bigger than pins' heads, adhere, bound down by the thick external layer of cuticle.

Monday, 25th.

The face is restored to its natural state. A few minute scabs remain upon the fingers. These fell off after a few days, and the restoration of health and good looks was perfect, neither pitting nor deformity being left by the disease.

I have placed this case nearly last in the series of these eruptive diseases, on account of the character and severity of the febrile symptoms and the great number of the pocks ; but its quick progress and the shortness of its duration would rather entitle it to a different situation. Such threatening signs of fever, accompanied by a brown dry tongue, indescribable restlessness and utter depression of muscular strength,

Contrast
between this
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I have never, amongst the whole catalogue of diseases that I have witnessed, known so rapidly recovered from, the patient being able to walk about in perfect health and vigour in the short space of ten or eleven days from the commencement of the attack. Nothing ever appeared to me at once so like, and so unlike small-pox ; so like it in the form of the eruption at a certain period, so unlike it in every step of its progress. Every remark which I made upon the preceding case is equally applicable to this, in regard to the absence of secondary fever, tumefaction of the hands, &c. and an additional distinction applies to it, for, wherever, in small-pox with typhoid symptoms, numerous spots remain upon the extremities without advancing regularly into prominent vesicles, a fatal event has, according to my observation, invariably followed, and is always to be dreaded in proportion as the appearance of the pocks is retarded after such spots have shown themselves ; but in the above remarkable case, the febrile symptoms were removed and health nearly restored, whilst the limbs were mottled with hundreds of red specks, which gradually disappeared without having risen to any prominent eruption.

I have not learned that any case exactly like this occurred during the epidemic in Norwich. I, however, saw one which resembled it in

kind and severity of the febrile symptoms, and where the surgeon who attended was as much surprised as myself by the speedy and favourable termination of a disease, the commencement of which made him full of apprehension for the result. As I had not an opportunity of following every step of the eruption, I can only give the leading dates and characters of the disorder, which will probably be deemed quite sufficient after some of the foregoing histories have been related at so great a length.

C A S E XVI.

The patient is 16 years of age. She was vaccinated when two years old, and pronounced to be safe. One scar remains on the right arm, less than a sixpence, shining like a cicatrix, without any foveolæ.

Towards the latter end of June, she waited upon a child with the small-pox, and refers her complaint to that source. After two or three days of severe indisposition, attended with much fever and a brown tongue, she came out with an eruption on the 8th of July, which in two days presented minute pocks, so exactly like those of small-pox, that the Surgeon, supposing her really to have taken this disease, entertained fears for her safety with so

Abundant
eruption of
indented
pocks, with
typhoid symp-
toms.

abundant an eruption. On the 11th, when I saw her, the hands, face and arms were completely occupied by minute pocks, distinct, circular and indented in the centre, and so numerous that they must have become confluent had they increased much in size and taken the course of regular small-pox. Upon the trunk, the eruption was less abundant and not so well marked. The lower limbs were entirely covered with circular dull red spots, without any prominent eruption. There was slight soreness of the throat. Had any surgeon seen this patient at this time, without being acquainted with the history or date of the eruption, I think it impossible for him to have regarded it as any thing else than a serious case of small-pox, greatly endangering the life of the individual, so numerous were the eruptions or blotches, so characteristic the form of the pocks, and so considerable the restlessness and fever under which she still laboured; but on the next day her symptoms became alleviated, and on the 14th, (being the *7th day* of the earliest *eruption*,) the pocks had almost without exception incrusted into thousands of minute, flat and circular scabs, without having assumed a pustular or yellow appearance in any part save the face.—On the 17th, the scabs had fallen from the face, which was marked by

numerous elevations of the cutis, and an universal desquamation of the cuticle. The arms were covered with circular scabs, in general not exceeding $\frac{1}{2}$ of an inch in diameter, and so close as almost to touch each other. Scabs of a similar size and shape adhered to the trunk and lower limbs, but less abundantly, the intervening spaces being occupied by small blotches where no vesicles had risen, and consequently where no scabs had been formed.—On the 19th, most of the scabs were separated from the rest of the body, leaving shining blotches, and accompanied by an universal desquamation of the cuticle. Spots still remaining, upon which no vesicles had arisen.—On the 24th, she was well, and returned to her service. A general redness of the face and limbs, and fragments of half-separated cuticle, were observable three days afterwards, all traces of the blotches having vanished. Her health remained perfectly good, and in the following December the only effects of the disease were a few very small pits upon the forehead, requiring attentive examination to discover them.

Four of her brothers and sisters, who had been vaccinated at the different dates of 14, 7, 5 and 3 years, were in the same house with this girl during her indisposition, and none of them took the disease, nor had an eruption of any kind.

Each of the cases which I have introduced into this third section embraces only a few of the characters of these eruptive diseases, but the whole together comprise the principal varieties that I have witnessed, and I have therefore thought the introduction of more would be superfluous. I am convinced that no one can form a just opinion of them, by seeing them merely for a few minutes, or a few hours; they must be watched day after day, throughout the whole of their course, which is the way in which I have observed them, and a review of all the notes I have taken enables me to offer the following general description of their origin, symptoms, progress and termination.

General description of these eruptive diseases.

Precursory symptoms.

These complaints were most frequent in the months of May, June and July, when the small-pox was most abundant. They have seldom, under my observation, attacked all in a family, rarely more than three out of five, and more commonly only one out of several. The precursory symptoms have varied in duration from one to three or four days, and have consisted of pain in the back and limbs, restlessness, vomiting, and occasionally delirium, with the usual marks of fever, generally inflammatory, sometimes bilious, and in a case or two typhoid in its characters. These symptoms have been always alleviated by the first appearance of

the eruption, but have in some few instances continued severe for three or four days later, until the coming out of the pocks was completed, after which they have never returned so as to mark a regular stage of suppurative or secondary fever. The rash, of which I have already spoken, was sometimes the only addition to the febrile symptoms ; at other times it has preceded an eruption of pocks, or appeared after these had come forward, retiring again in 24 or 48 hours.

In those cases, where the eruption never presented the indented character, the precursive symptoms have been of short duration, the vesicles few in number, and the whole disease terminated in seven days, without the formation of any regular or circumscribed scabs. But in a great majority of instances, and always where an abundant eruption has shewed itself, some of the pocks have been indented, and to these, which were the only cases of severity, the following remarks are exclusively applied.

The eruption has often been first observed upon the hands, sometimes upon the face and neck, or shoulders, and fresh spots have come out as late as the third or fourth day. The first appearances have been small red specks, in the centres of some of which, minute circular pocks, remarkably indented in the centre, have

Situation and
quantity of
the eruption.

been evident in 24 or 36 hours. As to number they have varied from 20 or 30 to as many hundreds. The eruption has made very various progress in different parts of the body of the same individual, advancing most rapidly upon the face, where it has usually lost the circular and indented character on the 3rd day, and on the 4th or 5th become filled with a purulent fluid. Even when not very numerous, the pocks have, in this situation, run into each other, attended with some swelling of the cheeks and eye-lids on the 4th or 5th day, but never so as to close the latter, and always forming crusts of an irregular shape, making rough and accumulated masses.

On the hands and arms, the indented pocks have been most numerous, and have mostly lost the indentation on the 4th or 5th day, their surfaces changing from flat and depressed, to convex or spherical, and their contents passing from a colourless lymph, into a turbid, wheyey, muddy and (in a few pocks) even purulent fluid. The largest distinct pocks, examined at this time, have exhibited the base occupied by adhering lymph, which could not easily be removed. The pocks, in this situation, were hard and resisting to the touch, never being broken by accident, and never marked by a red circle, at their circumference, save a minute

line, to be discovered only by the magnifying glass.

Upon the trunk, the eruption has always advanced with less regularity, being often interspersed with irregular vesicles, consisting of one cavity, and forming no regular scabs. Similar appearances, in the progress of the eruption, have been visible on the lower extremities, a few only advancing so as to be indented and subsequently convex, whilst the rest have remained as conoidal vesicles, or circular specks under the cuticle forming no prominent eruption. Incrustation has been nearly completed, in most cases, by the 6th or 7th day, a few insulated pocks remaining sometimes a day or two longer, in the midst of completely formed scabs.

The incrustation has been most complete upon the upper extremities, every pock that in its progress was indented, leaving a flat, circular and solid scab, frequently marked by an ^{Period of Incrustation.} indentation in the centre, and seldom more than $\frac{1}{8}$ of an inch in diameter. On the trunk and lower limbs, there have been fewer of these regular scabs, proportioned to the number of regular pocks in those situations. In cases where the eruption was abundant, the scabs have been particularly numerous upon the hands and feet.

In every instance, the throat has been sore, and I have never examined on the 3rd or 4th

State of the
throat, and
falling off of
the scabs.

day of the eruption, without finding small, circular and yellow specks on the tonsils, or posterior fauces, or in both those situations.

The scabs, on falling off, have, perhaps without exception, left tubercular elevations on the cheeks, which became absorbed in a week or two. Occasionally a few such elevations have been left on the arms, but more often, the only appearance has been that of slightly convex surfaces, not distinguishable by the touch. The traces of the disease after the falling off of the scabs from the rest of the body have been confined to the appearance of small circular dull-red specks, which have disappeared. Where the eruption has been abundant, there has been an universal desquamation of the cuticle. The scabs have separated most quickly from the face, next from the arms, and lastly from the hands, where they have been bound down by a thick layer of the cuticle, through which they could be seen, as through a coat of varnish. No pits have remained in any part of the body, except a very few trifling ones upon the forehead, nose or cheeks; no deformity or permanent injury has been produced, nor have these eruptive diseases, to the best of my knowledge, been attended with a fatal result, although in a few instances, from the nature of them not being properly understood, and the progress of them

not sufficiently attended to, danger was apprehended. The milder of these cases have corresponded to certain descriptions of varicella, the severer have been regarded as modified small-pox; but in this part of my treatise, I wish to confine myself to an account of what I have actually seen, deferring the consideration of the classification of these diseases to a subsequent chapter. I regard them all as a series of the same complaint, and feel little hesitation in announcing my belief that they all proceeded from the variolous contagion. They occurred at the time when small-pox was most prevalent, often when subjects suffering from this destructive malady were in the same room or in the adjoining house; they were at other times traced to exposure to small-pox, and at others they preceded, for a few days, the appearance of this disease in the family. The cases which never advanced so far as to present indented poeks, I have not known submitted to any experiment; but the mildest examples, where such indentation existed, have been found communicable by inoculation, producing in a few instances small-pox in those who had not before had either that disease or cow-pox, whilst in a small proportion of the vaccinated they produced an eruption similar to themselves in mildness and duration. These experiments have not only been instituted

They all probably proceed from the contagion of small-pox.

by medical men, but parents have likewise performed them, furnishing opportunities of watching the result. The character which I regard to be common to the whole of these eruptions is that in each case some are found to consist of pocks divided into cells, which structure is proved to exist in all those possessing an indentation in the centre, and it is this cellular structure which distinguishes them in the eye of the pathologist, from the vesicular eruption, described in the second section of this chapter.

This short general description, added to the cases which I have minutely detailed, will, I hope, convey some idea of these eruptive diseases to those who are not already intimately acquainted with them, and I wish to throw the one and the others into our common magazine of pathological knowledge for future consideration, aiming at no greater merit than that of having observed attentively, and recorded faithfully, with the earnest desire to discover truth and facilitate the advancement of medical science.

PART THE SECOND.

C H A P T E R I.

Of the distinctive Characters of the Small-pox.

THIS malady is so various in the characters which it assumes, that it has been called by some authors the multiform disease. When prevailing epidemically, it sometimes destroys above one-third of those affected by it, and at others not more than one out of fifty; but it is unnecessary to refer to different periods to observe these unequal effects, as it assumes all the possible extremes of virulence and mildness as often as it spreads extensively in any district, and, where only half a dozen in a family are attacked, it is not uncommon to find one or two suffering a slight indisposition, and exhibiting a few pocks, whilst the rest are masked with a hideous disease.

Varieties in
the small-pox.

In endeavouring to represent a few of the marks which have been regarded as distinctive

of an eruption being the small-pox, I shall pass by the severest forms of the disease, because they never occur unmixed, and can scarcely become the subjects of a difference in opinion. Referring, therefore, to the milder cases, in which the pocks are distinct or coherent, I shall briefly consider what have been, or ought to be regarded as the signs of a person really having the small-pox.

Preceding indisposition, and coming out of the eruption.

The preceding indisposition has been mentioned by writers in respect to the *prognosis*, but can never be considered decisive of an eruption being variolous, if the subsequent progress of the disease, or some collateral circumstance, does not explain it to be so. When, however, the eruption of small-pox has gone through its regular course, it has been generally found to be preceded, even in mild cases, by three or four days of severe indisposition, with fever, vomiting, pain in the back and limbs, and tenderness in the epigastric region. The coming out of the eruption has also been regarded as characteristic, appearing first upon the face, and being fully completed in three or four days. Van Swieten, who has treated most copiously of the small-pox, says, the milder the disease, the longer the eruption is in coming out, (*non enim, simul et semel prodeunt omnes;*) * and that he

* Comment. in Boerhaav. Aph. T. 5. p. 83.

has seen fresh pocks appear as late as the sixth or seventh day, not acquiring so large a size, but maturing as quickly as the others.

The progress of the eruption at the latter stage has been described as presenting appearances sufficiently uniform to be relied upon, each of the pocks which came out early increasing regularly in size, changing its contents to a turbid fluid by the fifth or sixth day, and on the eighth becoming distended with true pus. This opinion has been so often expressed by different authors, that I need not particularize them ; but however correct as a general observation, it is liable to exceptions that destroy its value. Dr. Adams * has related the symptoms of a sort of small-pox where the pustules were small, nearly globular, and of a pearl-colour from their not maturing perfectly. It was as mild as the inoculated disease, remaining white on the face as well as on the rest of the body, and leaving no pock-marks. Dr. Jenner's † account of a benign small-pox which he witnessed previously to his discovery of vaccination, seems to have been of a similar nature ; it was usually so mild that a confluent or a fatal case was scarcely heard of, and it was so little dreaded by the lower classes, that they scrupled not to

Period of ma-
turation, and
secondary
fever.

* Popular view of Vac. Inoc. p. 24.

† Inquiry into the Effects of the Variolæ Vaccinæ. p. 54.

hold the same intercourse with each other as if no infectious disease had been present; yet a considerable number who had this disease, were inoculated with variolous ichor* some years afterwards, and not one of them received the infection.

Crimson circle around the pock.

Peculiar variolous fœtor.

A crimson areola encircles the variolous pustule at the time of suppuration; and the febrile symptoms, which in mild cases disappear on the coming out of the eruption, return during the suppurating stage, and attend also the commencement of scabbing. This secondary fever is always present in cases where the eruption is plentiful, but it is often not observable where the pocks are limited to a small number. The same remark applies to the variolous fœtor, which is either entirely absent, where the disease is mild and the eruption scanty, or so slight as to be with difficulty perceived. If the suppuration be imperfect, as has been shewn to be sometimes the case, the crimson circle will be slight or entirely absent, and the secondary fever as well as the peculiar fœtor not at all to be distinguished.

John Hunter † has reported the dissection of a fœtus born with the variolous eruption, and in order to prove that, in the case related,

* Further observations on the Variolæ Vaccinæ. p. 53.

† Philosophical Transactions for 1780. V. 70. p. 132.

the eruption was truly of that kind, he examined each pock and found a slough of the cutis answering in dimensions to the size of the pock. It is this slough which in some instances forms the pitting, and which that eminent Pathologist believed to be peculiar to the small-pox, being an invariable attendant upon every pustule which goes through its regular course before scabbing. John Hunter seems to have believed that the formation of a slough was owing, not so much to the intensity and degree, as to the peculiar kind of the inflammation*, since it occurs in very mild cases, where we should expect the inflammation to be moderate. Mr. Ring and Dr. Adams have agreed to this slough forming the certain sign of small-pox†.

The slough
answering to
each pock.

The foregoing observations refer to the eruption itself, and imply the necessity of witnessing the disease at its commencement or during its progress; but other signs have been given, drawn from the remote effects.

* On Blood, Inflammation, &c. Introduction, p. 8.

† "Whenever any future doubts are entertained of this disease, let those who are disposed to write upon the subject dissect the pustules *about the time* they become *purulent*, before they scab, and at the bottom of each will be found a loose slough of a circular form, about the thickness of writing-paper, which it resembles when soaked. If this is found, the disease is small-pox; if it is not found, the disease is not small-pox." Adams in Med. and Phys. Journal, V. 13. p. 7.

The scars
left by small
pox.

I apprehend that it is only in the absence of opportunities of watching the course of the eruption, that the scars left by it can be regarded as assisting very considerably in the diagnosis. Mild small-pox often leaves no scars at all; but, if they are found any where, they are most often situated upon the face, exhibiting irregular pits of the colour of the surrounding skin. Superficial, circular and large scars, of a lighter colour than the surrounding skin, have been stated to indicate the preceding disease to have been spurious small-pox, and my own observations upon the subject entirely coincide with such an opinion. I should, however, advise no one to make a decision upon these effects of a disease which he has himself witnessed, it being only in the absence of such opportunities that an examination of the scars can be reasonably undertaken with a view of ascertaining whether an individual has really had the small-pox.

Its protecting
against a
future attack.

It being a general rule that a person who has once suffered from this disease will be free from it during the rest of his life, some argument has been drawn from this circumstance in settling the question as to the nature of a doubtful eruption. Even upon this point, there are numerous sources of error, as it has been already shewn that no inconsiderable

proportion of persons are proof against small-pox under all situations of exposure, whilst some suffer from it at one time who formerly resisted it, and a few have it unequivocally twice* in the course of their lives.

It has been supposed that an eruption capable of giving rise to small-pox in others, was thereby proved to be small-pox. A child † being born with an eruption like variola, its nature was decided by inoculation from it producing regular small-pox. This can only be estimated as a test in the absence of the advantage of observing the doubtful disease during its progress. Nurses ‡ have contracted a few pustules upon those parts against which children labouring under small-pox have rested, and the contents of these pustules have produced regular small-pox by inoculation. Without collateral testimony, therefore, it must be allowed that this experiment by inoculation can only prove the doubtful case to have proceeded from the variolous contagion, and not that it

Its giving
rise to small-
pox in others.

* Dr. Hennen (Ed. Med. and Surg. Journal, V. 14. p. 460.) has quoted above 150 writers in different languages, and in all ages since small-pox was first described, who have expressly stated their opinion of the occurrence of this disease twice or more to the same individual.

† Mem. of the Med. Soc. of London, V. 4. p. 364.

‡ Jenner's Facts for the most part unobserved, or not duly noticed, respecting Variolous Contagion. p. 5.

ought itself to be regarded as regular small-pox, of such a kind as would encourage us to expect it to secure the individual from a subsequent attack.

The question of determining the nature of an eruption by its protecting against a subsequent attack of small-pox, leads us to the consideration of the various appearances assumed by the inoculated disease.

Varieties from
inoculation
of small-pox.

When the eruption from inoculation goes on regularly to maturation, and a pink circle surrounds each pock, there often is still no secondary fever, if the eruption be scanty; but it happens not unfrequently that the eruption declines after maturing imperfectly or not at all. Heberden* suspected the future security of the patient in all such cases. Dimsdale† was satisfied where the inoculated place rose well, although no eruption or a slight and non-maturing one appeared, because he had invariably found such patients proof against the small-pox, both under inoculation and exposure to the contagion. The most experienced inoculators have entertained the same opinion; but there have been numerous exceptions, and one Surgeon‡ mentions eight cases in his own practice,

* Comment. de Morbis, Cap. 95.

† Dimsdale on Inoculation, p. 49.

‡ Mr. Kite in Mem. of the Med. Soc. of London, V. 4. p. 136.

where small-pox took place a few weeks or months after the inoculation. Few of the pustules produced by the inoculation matured completely, but every one, as this writer observes, knows that this is frequently the case in real small-pox, when the eruptive symptoms have been moderate. Still it must be acknowledged that the non-maturing eruption, which Dimsdale calls the short way of having the disease, protects generally against small-pox, which is not to be solely attributed to the general and imperfect eruption, as there is a regular pustule upon the arm ; and in all these instances the crimson circle around the pock, the secondary fever and the variolous fœtor are wanting.

Amongst the numerous characters that have been regarded as distinctive of the small-pox we therefore find that no one of them taken singly can be implicitly relied upon, and, to prove the difficulty of their application, every practitioner who sees much of those amongst whom an epidemic small-pox is prevailing, meets with cases so slight and so imperfectly marked, as to leave him doubtful of the eruption affording protection against a subsequent exposure to infection.

We have to regret that neither Willan, Bate-man nor Alibert, who have minutely attended

Inattention
to the anato-
mical struc-
ture of the
variolous
pock.

to the diseases which particularly shew themselves upon the skin, have noticed the character of the cutaneous eruption of small-pox, and notwithstanding the very excellent description of Mr. Moore, (*Hist. of Vaccination*, p. 102.) an account of the anatomical structure of the variolous pock, in connexion with its progress, remains a desideratum in medical writings.

Inflammation affecting a portion of the cutis, seems to be the immediate cause of the acute, and perhaps also of the chronic eruptive diseases, that attack the skin, and the degree of inflammation will alter the character of the eruption in a very singular manner. A lady above forty years of age was for a long time subject to an eruption upon the epigastrium, presenting sometimes a rash, sometimes vesicles filled with a limpid fluid, and at other times pustules. This eruption usually recurred at regular intervals of one month, and by regimen she could vary the form of it, or by low diet and the use of medicine, prevent it altogether. The degree of local inflammation, regulated by the more or less plethoric state of the system, appeared to be the only assignable cause of the vesicular or pustular form of the eruption. The same variations occur in the phenomena of many inflammatory diseases.

The arrangement of eruptive diseases in our

Pustular or
vesicular
character of
an eruption
determined
by degree of
inflammation

systematic writers is *pimples*, *scales*, *pustules* and *vesicles*. Would it not be more conformable to the progress of these diseases to reverse the order of the last three, as an eruption answering to the definition of a vesicle, often becomes pustular in its progress, but a pustule never changes into a vesicle or pimple, although all three may dry into crusts or scabs? The vaccine pock, which is placed amongst vesicles, is by a little rubbing converted into a pustule.

If we attend to the growth of the variolous pock, in a regular and distinct case, we shall find it successively changing from a minute red spot, to a pimple, a vesicle, a pustule, and at length ending in a scab. Each of these terms may therefore be applied to it, and almost any form attributed to it, if reference be not made to some particular period of its progress.

Structure and
progress of a
variolous
pock.

The first indication of that change in the cutis which is followed by a distinct variolous pock, is the appearance of a small red spot, in the centre of which a firm knot is perceptible to the touch, although not so soon visible to the eye. In 24 hours, a pimple is observed in the centre, which increases so as to present an acuminate vesicle; this gradually changes its form during its growth, so as to present, on the fourth day, a vesicle perfectly circular, somewhat flattened upon the top, and indented remarkably

in the centre, as if the point of a pin had been pressed upon it, and the impression remained. At this time the vesicle is about $\frac{1}{8}$ of an inch in diameter, and has often a reddish or blueish appearance, (from the inflamed and very vascular portion of the subjacent skin being seen through it,) being filled with a limpid fluid contained in different cells.

Cellular
structure of a
pock.

To a cellular structure of this sort the term *pock* should perhaps be strictly confined. The walls of the cells being perfectly transparent, the disposition of them during life is not easily ascertained ; but they are more readily examined in the dead subject, and the arrangement of the partitions, first described to me by Professor Macartney of Dublin, (whose researches in minute and comparative anatomy have been so justly appreciated,) I have found to answer to the axis, spokes and circumference of a wheel. Besides the cutis, which is external, and the very vascular surface of the skin forming the basis of the pock, there is the cellular structure formed by the *rete mucosum**,

* The vaccine pock bears a strong resemblance to the variolous, yet, from the foveolous appearance of the scar, it seems probable that the cells are differently arranged, Dr. Willan, (*On Vac. Inoc.* p. 9.) speaking of the cells of the vaccine pock, says "these are perhaps only a portion of the *cellular membrane* distended by the effusion of lymph." This observation shews how little attention he gave at the time,

or by a freshly organized substance thrown out by the cutis itself, and excavated into cells for holding the fluid of the pock. The walls of these cells secrete the contained fluid, and if this be partly let out by a puncture, the drying of the lymph closes the point opened, and the fluid is again secreted, distending the pock to its former shape. Inoculation is practised most successfully with the transparent lymph taken from a pock in this stage of the eruption.

The pock grows more in its circumference than in its elevation subsequent to the 3rd or 4th day, and by the 5th or 6th its size is $\frac{1}{4}$ of an inch, the indentation is less observable, and the contents cease to be transparent. A red circle shews itself at the circumference, and becomes wider as the pock increases, the circular shape of the latter being still retained. After this period the surface becomes convex, the point which was indented being now the highest part; the circular shape is lost, the pock changing to oval, oblong or irregular; the contained fluid, at first turbid, is afterwards

to the situation and structure of the vaccine pock, the *cellular substance* being deep and out of the way, with the dense and less vascular part of the skin between it and the basis of the pock. Cotunnius (*De sede Variolarum.* p. 202.) came nearer the true situation of a pock, placing it neither in the cutis nor cuticle, but rather between the two.

purulent, and the cellular structure is altered, the walls or partitions being thinner, broken up or partly absorbed, so that a great proportion of the fluid will escape by a single puncture. These changes are effected by the 8th day, when incrustation commences, and proceeds in one of two different ways—either the pock bursts at its apex, allowing a part of the fluid to dry as it exudes, or the thinner parts evaporate without the pock bursting, while the denser parts form, with the cuticle, cells and slough of the pock, a thick, convex and nearly circular scab, one fourth of an inch in diameter.

As it is necessary to have some general description as a standard of reference and comparison, I do not know that a better can be adopted than the structure and progress of a pock. After having proceeded thus far, we might consider the variation in the number, size and situation of the pocks, with the symptoms produced thereby; but upon these subjects I shall decline entering, having in some pages of a preceding chapter alluded to several of those characteristic marks which can only be estimated by referring to the quantity as well as duration of the eruption. In the most regular small-pox, the eruption advances variously in different regions of the cuticular surface, influenced by the particular structure of

Variations of
the variolous
eruption in
different re-
gions of the
cuticular sur-
face.

the part. On the face, where the skin is most vascular and the cuticle thinnest, suppuration takes place most rapidly and completely, and the pocks generally rupture at the time of incrustation. But varieties also occur that cannot be assigned to the structure of the part affected, vesicles formed of simple elevations of the cuticle being intermixed with the most *regular pocks*, and small and incomplete pocks arising near *them* which never present the indented character. Seeing that such differences are met with in the same case of small-pox, may it not be possible for the variolous contagion to be so mild in its action, that the pocks never advance beyond the pellucid or turbid state, when maturation, areola, secondary fever, peculiar fœtor, and even the slough will be wanting, leaving us to decide by the few remaining and uncertain *criteria*, and by the protection afforded against a future attack of regular small-pox ?

It appears then that mild cases may occur which cannot by any short rule be determined small-pox. Even the existence of a slough, which is the most direct rule that has been given, deserves not to be implicitly relied upon, its presence in all the pocks only proving small-pox, but its absence from a great proportion of them not proving the contrary. If a pock does not

No single
rule for deter-
mining small-
pox.

suppurate, will the slough ever be found? if it will not, then the suppuration is as much the test as the slough itself; but in the cases about which a question arises, suppuration is most often partial or incomplete.

These observations, it should be recollected, are directed against an implicit confidence in *any one* of the characters that have been held distinctive of small-pox, without affecting at all the weight of the evidence where several of them concur. Rejecting none of these distinctive characters, let us observe the whole course of a disease, and institute our comparisons in regard to the structure, quantity and progress of the eruption, and we shall not often fail to come to a right conclusion upon all such cases as are not too trifling to dispute about.

C H A P T E R I I.

A sketch of the History of Varicella.

FROM the earliest records of the small-pox, we meet with mild eruptive diseases, confounded with it in diagnosis, and important to be noticed because not preventing it. In tracing the various opinions upon this subject, under the title affixed to this chapter, I shall consider three distinct periods, introducing the authors whom I may happen to select, in nearly chronological order.

First period. From the earliest writings upon the small-pox to the introduction into Europe of the practice of variolous inoculation.

This includes several centuries, during most of which it was so common for authors to copy strictly from each other that little is to be collected. Rhazes, who wrote at the beginning of the 10th century, and who has left the earliest

Three periods
in the history
of varicella.

account of the small-pox, directs the same precautions to be used with those who have had only a mild or spurious eruption, as if they were liable to the disease, because such an eruption does not protect them when the small-pox is epidemic*. Succeeding writers have mentioned in the same indefinite manner an imperfect eruption not protecting against a future attack of the small-pox, designating it by the terms improper, spurious, lymphatic, crystalline, &c.

Rhazes,
A. D. 900.

Vidus Vidius,
A. D. 1550.

Vidus Vidius observed of the crystalline eruption, that it did not attack all persons in the course of their lives, like small-pox and measles, for which reason, and its extreme mildness, he separated it from those two diseases, which were in that age described together as belonging to the same species. Sennertus enumerated as spurious eruptions *sheep-pox, horn-pox, wind-pox*, giving no description from his own observation, but supposing that the two last terms were applied to the crystalli of preceding writers.

Sennertus,
A. D. 1620.

Riverius † quotes from Ingrassias a precise description of this eruptive disorder, resembling small-pox in size and figure, occurring mostly in children, presenting colourless vesicles filled with a serous fluid, bursting and drying up on

* De Variolis et Morbillis, Cap. 5.

† Riverii Oper: p. 548.

the third day without danger: he adds, by way of distinction, that “*variolæ cum rubore et inflammatione apparent.*” A little later in the same century, our distinguished countryman Sydenham, in describing a variolous epidemic, alluded to a spurious kind, having no connexion with the real disease*; but he gave no further account of it than by observing that those in whom it appeared were not prevented from subsequently having the small-pox. Morton about this time adopted the term *chicken-pox* from the vulgar and introduced it into our medical nomenclature, applying it to what he considered as the mildest sort of small-pox, in which the pustules, somewhat larger than those of the regular small-pox, are thinly spread over the body after two or three days’ indisposition, and rapidly disappear without secondary fever†.

Sydenham
A. D. 1670.

Morton
A. D. 1690.

* “Adulterinum variolarum genus aliquod, ad hunc morbum nihil attinentium.” Sydenh. Oper. p. 132.

† “Unâ nocte turgent, et tertio die post citam maturationem exarescent, sine febre vel alio quovis molesto symptomate præter dolorem partium affectarum inflammatorium.” Mortoni Op: T. 3. p. 58. His first case is that of a child 11 years old, in whom an eruption came out on the 3rd day of fever, and disappeared in a day or two without maturation, leaving the patient tormented with head-ach and epilepsy for a whole year, when health was restored after a regular course of the coherent small-pox. (*Variolæ benignæ statim ab eruptione, sine precedenti maturatione exarescentes, atque demum post annum integrum repullulantes.*)—His next case is entitled, “*variolæ maximè benignæ dictæ chicken-pox,*” the eruption appearing on the 3rd day with complete relief of the symptoms, the next day filling with pus, and by the following being dried up.

More addicted to theory than his illustrious contemporary, he mingled his histories of disease with his preconceived doctrines.

A brief review of a few of the writers during this long period affords much variety of opinion about the *chicken-pox*, some regarding it as the mildest small-pox, others as of a different nature, and yet all agreeing that it had no power to prevent small-pox. The first employment of *this* term is an æra, and I shall attempt in the following historical sketch to ascertain whether it has since been used in reference to eruptive diseases of the same, or of different characters.

Second period. From the introduction of variolous inoculation to the discovery of vaccination.

Variolous inoculation was introduced into England in 1722, and thence slowly extended to the principal countries in Europe. The controversies that arose out of that practice drew the attention of medical men to the milder forms of variola, so that this period of less than four-score years abounds with writers whose observations might, in a professedly regular history, be collected together; but it will be conformable to my purpose to mention only a small number of them, with a view to shew the gradual growth of this question into a degree of importance which could not have been foreseen.

Fuller stands the earliest in this period. He joined extensive reading with much originality of observation, and gathered from all sources the various names given to spurious small-pox, <sup>Fuller,
A. D. 1730.</sup> forgetting that several of them probably referred to one and the same disease. He supposed that the chicken-pox of the vulgar was a small red pustulary eruption, invading with fever, cough, and sometimes sore-throat, and reaching the bigness of mustard-seeds. He lastly describes at length *the crystals** apparently from his own experience. Each of these disorders he expresses to depend upon a specific contagion, in a style peculiar to himself. “The pestilence can never breed the small-pox, nor the small-pox the measles, nor they the crystals or chicken-pox, any more than an hen can a duck, a wolf sheep, or a thistle figs, and consequently one sort cannot be a preservative against any other sort.”

* “These come out with the very same headach, back-ache, vomiting, fever and other symptoms usual in the true small-pox, but sometimes these seize children without any foregoing illness at all. They break out on the third or fourth day, in certain distinct bladdery pustules, dispersedly all over the body, commonly as big as peas (plump and shining like crystal, whence the name), which, if pricked, send forth clear water and no pus. When they are come out, there is no fever nor danger: in four days’ time they dry off, but leave behind them pretty broad red marks, which remain sore and tender in the flesh for a while.” Exanthematologiae, P. I. p. 163.

Hoffman,
A. D. 1740.

Hoffman, who advocated inoculation, reduced all these eruptions described under different titles to one class, *variolæ spuriæ*, of which he says, “erumpunt cum vesiculis magnis, pellucido humore oppletis, minori symptomatum agmine, vehementia et sine periculo*.” Van Swieten, who opposed the new practice, gave a more extended account of the subject—1st. prominent red pimples, breaking out from the first to the third day, becoming hard with very little fluid in them, and quickly drying up, (*steen-pocken.*) 2nd. Pimples full of thin lymph, especially at the top, (*water-pocken.*) 3rd. Vesicles distended with air and containing no lymph, (*wind-pocken.*)† All these varieties he states to have these characters in common, that they differ from the legitimate in the symptoms of the first stage, break out at no stated times, and leave no marks upon the skin. He has seen them attack the young and the old in great numbers, yet never knew any one die of them. Some, he remarks, have thought them to proceed from the same contagion as smallpox, seeing the spurious prevail when the genuine had done raging, but to this opinion he objects that they often attack the same

* Medicinæ Rationalis Systemat. T. 3. p. 33.

† Comment. in Boerhaav. Aph. T. 5. p. 19.

individual *twice* or *thrice*, occurring indiscriminately before or after the small-pox, and often at very short intervals.

The systematic Authors of the middle of this century embodied the different descriptions of writers in various countries into their works.

Vogel,
A. D. 1760.

Vogel accepted the term * varicella, and described one kind of spurious small-pox (*variolæ ovales*) as “*halone rubro cinctæ verisque variolis paullo majores.*”† Sauvages enumerated eight different species of variola, including those which had been regarded as spurious. In giving the synonyma of his first species, *variola lymphatica*, he says the English call it the water-pox, the eruption coming out without preceding illness, generally in children two or three years old, and after filling with pellucid or whitish lymph, drying up in three or four days without pitting or further inconvenience. His second species is *variola benigna*, which he declares to exhibit four distinct stages of fever, eruption, maturation and scabbing, and after describing the common progress of the disease through these different periods, he adds‡ that “ what

Sauvages,
A. D. 1763.

* Definit. Generum Morber.—1764.

† De Cognosc. and Cur. Morbis. cxxviii.

‡ Datar varietas in quâ septimâ die nulla suppuratio fit, sed pustulæ sensim resolutione terminantur sine periculo, et quandoque sine pyrexia sensibili; hanc varietatem resolutam Angli *chicken-pox* appell-

the English call the chicken-pox is that variety of small-pox in which the pustules terminate by resolution on the 7th day without suppuration or any perceptible fever, and without danger."

*Heberden,
A. D. 1767.*

The same year in which Sauvages died, Dr. Heberden* read his paper upon the chicken-pox, which has since been so often quoted and referred to. The points of doctrine which he principally set forth were that the chicken-pox (afterwards designated by him *variolæ pusillæ†*) was a specific disease occurring either after or before small-pox, affecting the same individual but once during life, and differing in name only from the swine-pox. The leading parts of his description of the disease were, that the preceding illness ordinarily lasted three days, but is sometimes so slight as to be unnoticed; the eruption mostly, not always, comes out first on the back, appears reddish on the first day, has on the second a small bladder on the top, of the size of a millet seed, sometimes full of watery and colourless, at others of yellowish fluid; and by the fifth day dries up into slight

lant, quod maximè distinguendum est à retrocessu pustularum, qui in aliis speciebus, aliisque stadiis accidit, &c." Nosolog. Methodic. T. 2. p. 369.

* Med. Transac. of the Coll. of Physicians of London, V. I. p. 427.

† Comment. de Morbis, p. 389.

crusts*. The form of these crusts is not described. The contents of each vesicle is stated to be probably not owing to suppuration, as in the small-pox, but to extravasation of fluid under the cuticle, as in a common blister; and no scars are left unless in one or two pocks an ulcer be formed by the sharpness of its contents, or by being much fretted. It does not appear that Heberden had ever witnessed inoculation from this disease, but he implies that it can be thus communicated, affirming that it has been inoculated from by mistake, producing an eruption which has passed with hasty and inexperienced observers for the small-pox.

Dr. Heberden paid little attention to what

* On the first and second days, Heberden observes, they are apt, from their itching and being very delicate, to be broken by rubbing or scratching. At farthest on the 3rd, and often on the 2nd day, as many of the pocks as are not broken seem at their height, and those that are fullest of the yellow liquor very much resemble what the genuine small-pox are on the 5th and 6th days, especially where there happens to be a larger space than ordinary occupied by the extravasated serum. He never saw them confluent nor very numerous, 12 on the face and 200 on the body. To such as have never had the distemper, he believed it to be as contagious as the small-pox, from which he distinguished it, 1st. by the vesicle full of serum at the top of the pock on the second or third day, and 2^{dly}. by the crusts being formed on the fifth day, when small-pox are not at their height of suppuration.—Heberden mentions a *more malignant* kind of chicken-pox, rising not with one little head or vesicle of serous fluid, but 4, 10 or 12 joined together, attended with severe fever, and pain in the back and limbs, which are not relieved by the eruption though not above 20 pocks.

had been done by preceding writers ; his doctrines and descriptions were the result of his own extensive experience, and the conviction of this being the case gave his opinion great weight with the medical profession. Notwithstanding, it is evident that his account of the *chicken-pox* was far from minute, probably not embracing all the varieties in degree of the particular eruption he had in view, and certainly not comprehending all the forms of eruptive disorders which had before been noticed under various appellations as spurious small-pox.

Sims,
A. D. 1769.

In a treatise upon epidemic diseases, Dr. Sims very soon afterwards published an account of an eruptive disorder to which he applied the term *chicken-pox*. The first symptoms of the disease he represented as so closely resembling the small-pox, that it was only to be distinguished by knowing which distemper prevailed at the time, and by the absence of that peculiar smell which he had always found accompanying the latter. In general, however, the disease was milder than small-pox, and it never proved fatal. The feverish symptoms did not abate immediately on the eruption, but as soon as they did there was no return of them. The eruption usually happened on the 2nd night, and so early as the 3rd or 4th morning, the pock assumed a pimply form, which *readily*

distinguished it from small-pox. It commonly dried on the 6th day, yet cases occurred wherein the symptoms running high, the pock growing large and filling with *yellow matter*, it remained until the 7th or 8th day, so as to be mistaken for the small-pox, and to have matter taken from it for inoculation. A similar error, Dr. Sims observes, may have induced some to believe that they really underwent the small-pox a second time, neither disorder being perhaps ever caught twice. In some instances, where the eruption was *deferred* a day or two, the fever ran high, with violent inclination to vomit, great headach, eyes inflamed and intollerant of light, until the appearance of the eruption relieved these distressing symptoms*. Dr. Sims was so convinced of this eruption not being small-pox, that he does not mention whether the latter was at the same time prevailing, nor whether any of those who had the former, were attacked with small-pox the following year when it was epidemic and very fatal. The want of evidence upon this last point must leave us in doubt whether the disease described by Dr. Sims was spurious small-pox, leaving those suffering from it liable to an attack of the true disease, or a mild sort

* Observations on Epidemic Diseases, p. 115..

of small pox, similar to what Jenner has described and to which the vulgar applied the term *swine-pox*, although it afforded to many the same protection as a severer course of the variolous disease would have done.

The description of Heberden and Sims were the basis of the doctrines of the day, and Dr. Baylies, who became a strong advocate of variolous inoculation on the continent, after having been instructed in England, asserted the infection of small-pox and of chicken-pox to be equally communicable by art, each producing a local inflammation which has no manifest difference whereby to judge from which of the venoms it proceeds, a question that can only be determined by the succeeding eruption *. Apparent failures of the variolous inoculation were thus explained—"mild cases having been sought for, and the patient only seen at the time of taking the ichor, the chicken-pox was often inoculated instead of the small-pox, leaving the patient as liable to this malady as before." There appears however to have been another way of coming at the same end, for M. d'Arcet, Professor at the College of France, about this time related the particulars of a

D'Arcet,
A. D. 1778.

* Baylies' Facts and Observations relative to Inoculation in Berlin, and to the possibility of having the Small-pox a second time, p. 95.

disease exactly resembling *variola** in the form of the pocks, attended by secondary fever, and suppuration of the pustules extending to the 13th day of the eruption, which was notwithstanding determined to be *varicella*, because two children were inoculated from this case without effect, yet took the small-pox when inoculated with variolous matter from another source. The subject of this extraordinary case was a gentleman of distinction, who had 30 years before been inoculated by a celebrated surgeon.

John Hunter† observed that the chicken-pox <sup>Hunter,
A. D. 1780.</sup> does not commonly produce a slough; but sometimes a pit or two is the consequence of it, ulceration having taken place in the cutis. Dr. Adams‡ believed a slough to occur, though rarely, in a few of the early pustules. Cullen§ <sup>Cullen,
A. D. 1785.</sup> followed the description of Heberden, making varicella a distinct disease, depending for its production on a specific contagion.

Burserius closes this period. He treats of <sup>Eurserius,
A. D. 1798.</sup> spurious small-pox under the title of varicella,||

* Journal de Medecine, Tom. 49. p. 303.

† Philosoph. Transac. V. 70. p. 132. ‡ On Morbid Poisons, p. 94.

§ Nosolog. Method. T. 2. p. 134.

|| "Pustulas referunt in marginibus valde rubras, in medio dia-phanas, quia ibi vesiculam humore lymphatico aut mucoso plenum habent.....Celerrimè suum augmentum attingunt ad pisí sæpe magnitudinem accedentes. Modo ante modo post veras variolas

agreeing to its being a disease without danger, the vesicles breaking and drying up in three or four days. He believes it chiefly to affect infants and children, and although the pocks are represented to become large as peas, he says the crusts are small.

In glancing thus cursorily over this middle period of the history of varicella, can we fail to discover that the introduction of variolous inoculation influenced in some degree the opinions of authors respecting it? Upon many of the most important points we find them differing—as to its arising from small-pox or a specific contagion—its occurring more than once to the same person—its being communicable by inoculation. Speaking of my own limited researches, I have not been able to find any direct record of inoculation from this disease, although allusion is continually made to the evils that have proceeded therefrom. But supposing it were shewn by direct experiment to have been so communicated, we might still enquire from which variety? whether the horæ-pock, described as small solid pustules with little fluid before the time of Sennertus, or the larger eruption of bladdery vesicles designated by the different titles of crystals, water-pox, swine-pox and chicken-

infestat; sed qui spurias expertus est, non adeo a veris immunis censendus est, in veras enim incidet, alio tempore non secus ac alii solent." Burserii Institut. Medicæ Practicæ, T. 2. p. 134—235.

pox? In the employment of these terms there has been some want of uniformity, the last having by separate authors been applied in the course of one century to an eruption of small red pustules, to crystals, and to the mildest small-pox unattended with secondary fever.

Third period. From the discovery of vaccination to the present time.

Jenner's discovery was promulgated in England in 1798, and the time which has since elapsed constitutes one of the most important divisions in the history of the disease I am considering. In France it continued to be believed that varicella could not be communicated by inoculation. A child,* reported to have been successfully inoculated with variolous ichor only a few months before, giving rise to an eruption of 80 pocks, was attacked by a disease exactly resembling small-pox in every essential point, the pustules being surrounded with a red circle, a majority of them filling with yellow pus, and many not incrusting until ten days had passed away: yet this was pronounced to be varicella, because matter taken from it, as it seems, on the latest day that it could be obtained, failed to produce any effect when inserted into the arms of two children who had not before had the small-pox. Some experiments by M.

Fréteau,
A. D. 1801.

* Journal de Médecine par Corvisart, Boyer et Leroux. 1801.

Valentine,
A. D. 1802.

Valentine * further strengthened the prevailing opinion that varicella was not communicable by inoculation, and this writer affirmed that the report of this having been done by mistake was itself an error. In the same year a doubtful eruption occurred in a vaccinated child in Paris, and Chaussier, one of the most learned of the present professors, joined his name with many others to attest their belief of its being varicella, because it failed to be communicated by inoculation.

Frank,
A. D. 1805.

The celebrated Dr. Frank of Vienna, who yet lives to explain his opinions, made a great innovation in the classification of spurious small-pox, separating it (in some measure contrary to his own arguments†) from true variola, and placing it in a different genus under the title of *pemphigus variolodes*. This he subdivides into two kinds, *vesicularis* and *solidescens*, his description of the former answering to the disease so often noticed as crystals or water-pox, ‡ appearing

† Journal generale de Medecine, T. 13. p. 171.

‡ Quas spuriis dixerunt variolas, has, licet veras interdum precedent, ac annunciare futuras videantur; licet ē insitione cum pure varioloso ac optimo instituta spuriis provenisse referant variolas; ac licet ob similitudinem in multis cum variola legitima, tam communi quam anomala seu abnormi, cum hac ipsā confundi facillimē queant, ad aliud tamen morborum genus, utpote à variolis natura diversas, relegamus." De Cur: Hominum Morbis, T. 3. p. 167.

‡ "Ad pisi magnitudinem, late circa marginem rubræ, citissimè excrescunt. Post nychthymeri fere spatium, jam seroso replentur ac

first on the back but sometimes on the face, bursting on the 4th or 5th day, and drying into small crusts, which soon fall off, leaving pits very seldom, and never protecting against small-pox. Without subjoining any particular description, he observes of the other species, *solidescens*—“*ob liquidæ materiæ defectum a pemphygo excludendæ viderentur: sed æqualis cum vesicularibus decursus, consueta cum istis societas, ac cito, non sine prævia ubique exulceratione, exsiccatio, easdem a pemphygo separari non sinunt.*”

In reverting to what occurred in England about this time, we meet with considerable acquisitions to the history of this disease. Mr. Ring, the zealous and meritorious supporter of vaccination, related a case of confluent varicella*, the first probably on record. It occurred in a vaccinated child, and a drawing was taken from the appearance of the eruption on the back at the 6th day, when it had already incrusted into irregular scabs. The form of the crusts on the rest of the body is neither represented nor described. This writer elsewhere† says that sometimes the chicken-pox, instead of terminating in seven days, continues

Ring.
A. D. 1805.

turgent liquore, nunc pellucido, aquoso, nunc flavo, nunc puriforme.”
Ibid. p. 238.

* Med. and Phys. Journal, V. 14. p. 141. †On the Cow-pox, p. 835.

twice as long, one case having come under his observation, in which the eruption was not complete till the 10th day, and the last vesicle had not disappeared until the 14th day.

Dr. Willan, looking to the different shapes which the eruptions in varicella assume, arranged them in three divisions*—1st. *Lenticular*; rising in small red protuberances, not exactly circular, having a flat shining surface, in the centre of which a minute vesicle is soon formed, which on the 2nd day is filled with lymph and about $\frac{1}{10}$ of an inch in diameter, on the 3rd contains fluid of a straw-colour, on the 4th presents vesicles broken, shrunk or puckered, few remaining entire on the 5th, and on the 6th every where dried into thin brown scabs; fresh vesicles breaking out in succession, make the disease longer by some days—2nd. *Conoidal*; the vesicles rising suddenly having an inflamed border; on 1st day acuminated, and containing bright transparent lymph; on the 2nd. turgid and surrounded by more extensive inflammation; many shrivelled on the 3rd day, but others which remain entire and shew much inflammation around them, evidently contain a purulent fluid and leave durable cicatrices; on the 4th day, thin dark-brown scabs appear,

Willan,
A. D. 1806.

* On Vaccine Inoculation, p. 87.

intermixed with others which are rounded, yellowish and semitransparent, and these fall off in 4 or 5 days; but as fresh vesicles come out on the 2nd and 3rd and go through the same course, the scabs last formed are not separated until the 11th or 12th day—3rd. *Globate*; the vesicles large, and their base not exactly circular, having an inflammation around them and containing at first a transparent lymph, which on the 2nd day resembles milk-whey; on 3rd day, the vesicles subside, become puckered or shrivelled; they likewise appear yellowish, a small quantity of pus being mixed with the lymph, and thin blackish scabs, formed before the conclusion of the 4th day, fall off in 4 or 5 days more*.

* Willan states that the eruption is usually fullest in the *conoidal* form of varicella, and he has seen the vesicles close together or coherent, but seldom confluent. (p. 93.) The observations which he has applied generally to varicella are: that infants are often affected with convulsions during the fever, and adults suffer severely—a severe cough and soreness of the throat frequently accompany the fever, which commences two or three days before, and continues sometimes to the third day of the eruption, and the disorder is attended, especially in children, with an incessant itching. The incidental appearance of pustules among the vesicles sometimes, he says, occasions a doubt respecting the nature of the eruption, but if the whole be viewed on the 5th or 6th days, every gradation of the vesicles will appear at the same time, which cannot take place in the slow and regulated progress of the small-pox. Nothing is said of varicella occurring more than once to the same person, and all the three sorts are referred to the same specific contagion. Vesicles of different characters are

The account of varicella by this eminent writer has since been so continually before the public, that I ought rather to state what he did not, than to copy what he did describe. He nowhere represents that the varicellous pocks are ever evidently indented upon the surface, and as his distinctions of the varieties of the disease depend upon the form of the eruption, it is impossible he should have neglected to do

often intermixed, but one kind generally prevails, which must determine to which of the three it belongs. The evidence contained in Willan's Work respecting the inoculating of varicella is slender and far from satisfactory. Two children of a surgeon were inoculated from a case of conoidal varicella. In one a small vesicle arose on the arm, which, on the 14th day was equal in size to a variolous pustule. On the 7th day after inoculation, two small red eruptions appeared on the shoulder which soon became vesicular. In the other case, a slight redness appeared on the inoculated place, which vanished, and afterwards a considerable number of vesicles with surrounding redness appeared on his body, leading Willan to suspect, from the irregular appearance on the arm, that the contagion might have been received from his brother, independant of inoculation. In three other instances furnished by Mr. Wachsel the experiment is confused by variolous inoculation being practised at the same time, and the ichor was taken from a child in whom the varicella appeared during the progress of regular cow-pox. (p. 99.)—Sore throat in varicella is omitted by Heberden, Cullen, Bateman and Moore. Willan seems not frequently to have found it present, for in his Reports of Dis. of London, (p. 140. A. D. 1801) he remarked that in a family of five children seized with chicken-pox, ulcerated specks or pustules were apparent on the tonsils, “a circumstance he never before noticed.” In the same report he adds that varicella was preceded in three cases by a universal rash, similar to that which often attends the eruption of small-pox. Dr. Bateman (*Synopsis* p. 212.) mentions this rash in varicella, although Willan rejected it.

so, had he believed such an appearance to occur in varicella ; it is therefore probable that he considered all eruptions having that character as modified small-pox, in his plates of which disease* the indentation is very accurately shewu. Neither has he alluded to warty elevations of the cutis being visible on the falling off of the scabs, and we may indeed assert that he intended to exclude from chicken-pox all eruptions answering to horn-pox, for his able commentator and successor, in criticising the arrangement of Frank already described, says the *pemphigus variolodes solidescens* is “the acuminate, warty, dry horn-pock, which is in fact small-pox†.”

The reputation of Willan for the minute discrimination of cutaneous diseases stood so high, that after the publication of his account of varicella, no important contributions were produced in England upon the subject for some years. A paper by Dr. Heim‡, who is at present one of the most eminent practical physicians in Berlin, produced a similar effect in some parts of the continent, although his opinions were in many respects different, the leading points of his description being, that

^{Heim,}
A. D. 1809.

* On Vac. Inoc. Pl. 2, 1. Delineations of Cutaneous Diseases, Pl. 47-48.

† Bateman's Synopsis of Cutaneous Diseases, p. 137—3rd. ed.

‡ See Appendix No. 1, for a translation of this paper.

varicella often presents the indentation of the pock like variola—that the same individual may be attacked twice or thrice with the disease—that in duration it may equal and in size surpass the eruption of small-pox—and that it is capable of being communicated by inoculation. In a vaccinated child M. Gilibert* described as a case of varicella an eruption preceded by four days of fever, consisting of pocks indented in the centre, and surrounded by a red circle, many becoming filled with true pus. Professor Montesante† of Padua published a memoire upon varicella which he had himself observed. He divided it into mild and severe, and in particularly describing the latter, he says no pock is depressed in the centre, nor does the contained fluid ever change into true pus; but whilst most of them are transparent, others are filled with thick fluid and have a red circle at their base, and these last remain the longest, even seven or eight days. The most abundant contributions to the increasing importance of this disease have been furnished by M M. Berard and de Lavit, who, in assigning a situation to certain eruptive complaints that occurred during an epidemic

Gilibert,
A. D. 1813.

Montesante,
A. D. 1816.

* *Traité du Pemphigus, ou de la Maladie Vésiculaire*, p. 313.

† *Considerazioni medico-pratiche sul Vajulo spurio o Ravaglione*,
1816.

small-pox at Montpellier, asserted that *varicella* may present the same symptoms, the same progress or the same form in the pocks, as variola, but their all occurring together can alone prove small-pox*. These writers relate one *varicellous* case in a vaccinated child, where the pocks were depressed in the centre and many of them became gangrenous; in another, the eruption was complicated with petechiæ; both ended favourably. The central depression is stated by them to have been often witnessed even in eruptions of the shortest duration, and in an instance resembling in every respect small-pox, it could only be proved to be varicella by failing to be communicated by inoculation†. The conclusion at which they arrive is, that varicella and variola are different only in the phenomena which each presents, and they believe that, when explored to the utmost, both diseases will be found to proceed from the same contagion‡. So many exceptions are

Berard and
de Lavit,
A. D. 1816.

* Il y a des varicelles comme des varioles, que l'on désigne sous les noms de *siliqueuses*, de *renteuses*, de *verruqueuses*, &c". Essai sur les Anomalies de la Variole et de la Varicelle, p. 185.—† Ibid. p. 156.

‡ At p. 175 of their Essay these Authors quote an Englishman for two fatal cases of *varicella*, an acquisition which I suspect must have been obtained in the translation. Underwood, in the 1st edit. of his Treatise on the Diseases of Children (1784) does not notice varicella, and in the 7th and last edit. (1819), he introduces one severe case of an eruption, resembling small-pox in appearance and attended with swelling of the face, which he set down for varicella, because the

admitted to every remark applied either to one or the other malady, that it is impossible to refute the arguments of the ingenious authors of this essay in any other way than by disputing the *data* upon which they proceed. A house may, however, be strongly put together and composed of the best materials, yet tumble *en masse* from the want of a sound foundation.

Fontaneilles,
A. D. 1817.

In a town, not fifty miles from Montpelier, the occurrence of an epidemic which in the unvaccinated proved severe and most fatal small-pox,

same patient died of small-pox 12 months afterwards. Underwood adds, in this 7th edit.—“I have known the head and face as much swelled as I have ever seen them in any distinct small-pox, however full, and the pustules containing a yellow matter with highly inflamed bases, and exceedingly sore ; and these have formed a complete mask on the face, after the turn, as is often seen in the small-pox”.—Although most of the very recent researches upon this subject in England have tended to get rid of chicken-pox, and introduce the word modified small-pox in its stead, we are unfortunately represented elsewhere in a very different light. The Author of a dense work of above 550 pages upon vaccination, dedicated to the King of Prussia, has quoted from the Hamb. Magazine of July 1817, the following passage in proof of varicella sometimes proving fatal: “*It will appear surprising that in the list of deaths in London from 12 Dec. 1815, to 10 Dec. 1816, 79 happened from chicken-pox and 1 from swine-pox!*” “Die Schuzpockenimpfung in ihrer endlichen Entscheidung, als angelegenheit des Staats, der Familien und des Einzelnen, von G. F. Krauss, p. 469. Nürnberg, 1820.—The source of this gross misstatement is inexplicable, and the facts accord badly with the justified assertion of Moore, that “no example has been recorded of varicella actually destroying life.” (History of Vaccination 1817.) A bad kind of pustular eruption has, however, been since mentioned, which appeared to be *nothing more* than a malignant chicken-pox, of which some died. (Correspondence of the Cow-pock Institution of Dublin, p. 52. 1818.)

gave rise to the publication of opinions about varicella in many respects at variance with the preceding. It is stated that this eruption seldom was indented, and though some severe cases occurred, none proved fatal. Every example of the disease, whatever resemblance it bore to the small-pox, was referred by Dr. Fontaneilles* to a separate and specific contagion, prevailing at the same time with the variolous, and varicella was affirmed to be propagated from one individual to another by inoculation. As I am not here discussing to what eruptions the term varicella should be confined, but representing in outline the forms of disease to which it has actually been applied, I shall reserve for a subsequent page a few observations upon these publications, and conclude the present chapter by alluding as briefly as possible to the most modern productions upon this subject in our own country.

The elegant historian of the practice of Vaccination has minutely traced the gradual progress of the variolous eruption compared with the quick and irregular advancement of varicella. Even on the first day of the latter disease, a small vesicle may usually be seen, and

Moore,
A. D. 1817.

* *Déscription de la Varicelle qui a régné épidémiquement et conjointement avec la Variole, dans la Ville de Millau en 1817, par F. P. Fontaneilles.*

little or no coagulable lymph is effused to thicken the cuticular membranes; a serous secretion, the production of cutaneous inflammation, is poured out under the *rete mucosum* almost with the rapidity of a blister, and little vesicles are quickly formed more pellucid than those in small-pox, yet surrounded with inflamed borders of various breadths. “On the second day, the vesicles are larger, but neither concave, clouded nor hedged round with coagulable lymph. But as they fill, the liquid separates the *rete mucosum* and cuticle from the cutis; and as one side yields more than another, the vesicles occasionally become oval, or lenticular, or in some degree irregular. Often, however, they retain a regular round figure, but not so constantly as in small-pox”*. When the disease is violent the inflammation is active, the vesicles run into suppuration, are enlarged and protracted in duration, obscuring all the discriminating marks; and in such cases the author, regarding varicella as produced by a specific contagion, says it is an important point to discover, if possible, the nature of the disease in those who communicated the infection. The difficulty is to distinguish small-pox of a

* The History and Practice of Vaccination, by James Moore, p. 138—1817.

milder and mitigated form from the most violent species of varicella. A case, in which the pustules were large and purulent could only be ascertained to be chicken-pox by observing the effects of it upon others, producing in three inoculated and five vaccinated boys of the same school the usually mild form of this disease. Events like this prove, in the judgment of the author, that varicella is still imperfectly discriminated, and that the talents of many will probably be required to finish the description of it.

The great attention more recently bestowed upon this subject evinces the opinion of Mr. Moore to be a general one, and shows the insufficiency of both ancient and modern rules and doctrines to satisfy the minds of men of the highest eminence. The observations afforded us by Professor Monro * upon contested points are: that in varicella the eruptive fever is of longer continuance than in mild small-pox, from successive crops of pimples coming out, and that it seldom presents that characteristic feature of the variolous pustule †, a depression in the centre, and when this appearance takes place, it is only on the drying up of the vesicles,

Monro,
A. D. 1818.

* Observations on the different kinds of small-pox and especially of that which sometimes follows Vaccination. † Ibid. p. 140.

whereas in small-pox the depression is perceptible at a more early period and goes off in the progress of the disorder, the pocks assuming a hemispherical form before incrustation. The crusts of chicken-pox, he observes, do not fall off entire, being composed of small yellow grains cemented together. He believes it to proceed from a distinct contagion, to occur only once to the same person and to be incommunicable by inoculation. Speaking of Cullen's description being applicable only to the milder cases of the disease, he says, "it is by no means descriptive of the more severe form of chicken-pox, in which the fever is considerable, the vesicles pass on to suppuration and pits are left by them which, in a few instances, have disfigured the face fully as much as those of the confluent small-pox, and which pits bear a resemblance to the small-pox *."

Mr. Bryce has limited chicken-pox to one kind of eruption, which he regards, in conformity with most English writers of the present time, to be a disease *sui generis*. It attacks with little or no fever, and the vesicles are often about the size of a split-pea when first seen, perfectly transparent and covered only by cuticle, thin as that raised by a scald or blister. On puncturing

Bryce,
A. D. 1818.

* Ibid. p. 138.

a vesicle, the clear lymph is wholly evacuated, the cuticle falls flat down and very little if any hardness is perceived on passing the finger over the collapsed cuticular bag. When the vesicles remain unbroken for four or five days, as is sometimes the case, the cuticular covering, as well as the contained fluid, becomes opaque, and the latter purulent. The vesicle is then much flattened, and in this stage of the disease it is scarcely to be distinguished from the small-pox, unless by the very thin, delicate and shrunken appearance of the covering cuticle. The central depression is never present in this eruptive disease, which seems to be further distinguished by the slight eruptive fever, the rapidity with which the fluid is secreted or rather effused into the vesicles, and its maintaining the same character in regard to transparency and thinness of the vesicles during the first and second days of their appearance, whether occurring before or after the small-pox or the cow-pox *.

This appears to me to be an enlarged and more explanatory account of the crystals of early writers and the chicken-pox of Heberden, the only respect in which it differs from the

* Edin. Med. and Surg. Journal, V. 14. p. 467.—These descriptions by Mr. Bryce are corroborated by additional remarks of Dr. Abercrombie and Dr. Alison.

latter being that it is a disease, according to Mr. Bryce, nearly or quite incapable of being communicated by inoculation, an opinion which the latter gentleman has not ventured to state without reasons sufficient to make the correctness of it very probable, having practised or witnessed thirteen experiments with ichor taken from an eruption answering to the above history without having produced even a vesicle upon the arm where the ichor was inserted.

The latest Author whom I have an opportunity to refer to, is distinguished for the labor and ability with which he has pursued this subject, as much as for the novelty of his opinions.

Thomson,
A. D. 1820.

His liberality, which I have myself experienced, is displayed by the indiscriminate introduction of communications, whether against or in favor of his doctrine, which is, that all the forms of chicken-pox, answering to the description of Heberden, Bryce and every other writer, proceed from the variolous contagion, and are capable of producing all the varieties of small-pox. In his history of the varioloid epidemic, he has therefore described under one head, all the eruptive diseases connected with it, whether denominated variola, varicella or modified small-pox, because he has continually met with them together and

apparently giving rise to each other. He even believes that the eruptions described as chicken-pox may prevent small-pox, which leads him into statements not unlike to those of Morton about the *variolæ repullulantes*, for in two cases where small-pox took place, in one 10 days, and in the other 8 weeks after a mild vesicular eruption, or chicken-pox, the author questions whether the two eruptions that occurred in succession were the effect of one or of two different infections *. Attending to the slighter shades of these eruptive diseases, he has himself added no new marks of discriminating between them; but the mass of information which he has collected with so much labour, and employed so ingeniously in support of his views of this subject, are a most important addition to the history of eruptive diseases connected in origin or in symptoms with the variolous contagion.

In thus tracing the various changes in opinion about the chicken-pox through succeeding years, we find the last and shortest period of its history not more free from contrariety than

* An account of the Varioloid Epidemic which has lately prevailed in Edinburgh and other parts of Scotland, with observations on the identity of chicken-pox with modified small-pox, by J. Thomson, M. D. &c. p. 202.

the two others, and as I have referred mostly to those authors, whose situations in their profession or whose writings upon this or other subjects have given them influence in the medical world, this sketch cannot fail to prove the difficulty of the question it involves.

CHAPTER III.

*Of Modified Small-pox, and its classification with
Variola and Varicella.*

IF the people of England have been backward in adopting vaccination, the medical profession deserves a very small share of the blame which attaches to the neglect of a discovery that has been the admiration of the rest of the world. British practitioners have not only furthered this practice with the greatest disinterestedness, but have studied the laws of the cow-pox, and its effects upon the small-pox, in almost all possible circumstances; and the remarkable influence possessed by it in softening the virulence of the latter disease, when it supervenes in consequence of previous exposure to contagion, yielded the earliest evidence of the modifying as well as preventive power of the cow-pox. The insertion of variolous ichor at the same time with the vaccine has usually produced an eruption so

Reception of
Vaccination
in England

mitigated and shortened in duration as to deserve a particular epithet. Where the eruption has come out during the vaccine disease, in consequence of previous exposure to the variolous contagion, the same effects have been observed. In vaccinating children whilst small-pox was in the same house, I have noticed a few pocks breaking out when the vaccine scab was forming, partially presenting an indentation on the second day, and drying up completely on the fourth; if the like appearances are repeatedly witnessed under such circumstances, this transient eruption may, with as much confidence, be referred to the contagion of small-pox, as if variolous ichor were inserted into the arm during the progress of the cow-pox.

Origin of modified small-pox.

Vaccination had not been long introduced, before it was ascertained that the variolous contagion was capable in some instances of producing the same effects at a remote period as during the progress of the vaccine disease, giving rise to a mitigated variolous eruption, which Mr. Dunning, one of the earliest and ablest supporters of vaccination, denominated modified small-pox. Numerous examples were from that time recorded in our periodical works and in separate publications, very much alike as to severity and duration of the disease; and it was supposed that the modified small-pox

was characterized by its origin from the variolous contagion, its presenting indented pocks and turning on the 6th day without secondary fever. These were, at least, the earliest opinions about it; but it does not seem improbable that more time and more extensive observation were required to ascertain all the varieties which this eruption might assume. Both these have now been afforded us, by the fatal prevalence of the small-pox in various parts of the British dominions, twenty years after we have become possessed of a method capable of completely extinguishing it.

It has been a matter of astonishment to the medical men of those countries in Europe, where vaccination has been almost universally adopted, to find so much attention bestowed in England upon this disease, with which they are scarcely acquainted; but where vaccination has been neglected, and small-pox in consequence prevailed, similar accounts have been published of the effects of the exposure of a great number of the vaccinated during a variolous epidemic. France, in the midst of political convulsions, persevered little in establishing regulations for the general diffusion of cow-pox, and the occurrence of small-pox epidemically in different districts of that Empire has been attended with cases of the modified disease. In Paris

Modified
small-pox in
France.

this name has been refused * to these cases by men of the highest character in their profession, whilst others † have warmly asserted that they were small-pox. The instances of modified small-pox that occurred at Montpellier during a severe epidemic, have been denominated aggravated cases ‡ of varicella, whilst a correct description has been given of them, and whilst they have been allowed to proceed from the variolous contagion and to occur with greater frequency and severity in the vaccinated. M M. Berard and de Lavit represent regular variola to have been met with in very few instances after cow-pox, and never where the vaccination was perfect and authenticated ; but they admit that the varicella, although it never proved fatal, sometimes resembled small-pox in severity of the primary fever, and the indented character of the eruption.

At Millau, a town containing 8000 inhabitants, above 200 were destroyed by an epidemic small-pox, whilst none of those properly vaccinated had the regular disease ; but the

* Rapport fait au Comité Central de Vaccine, le 19 Décembre, 1819.

† Gastellier, Exposé fidèle de Petites Véroles survenues après la Vaccination, 1819.

‡ Essai sur les Anomalies de la Variole et de la Varicelle, avec l'histoire analitique de l'épidémie éruptive qui a régné à Montpellier en 1816 ; par M M. Berard et de Lavit.

modified small-pox is stated by some to have been frequent, and Dr. Pougens* details many instances of an eruption half the size of regular small-pox, generally less numerous, always shorter in duration, and sometimes small and hard, scarcely suppurating. From a girl in whom the eruption was mild and turned on the 6th day, matter was taken which produced confluent small-pox in a child who had not been vaccinated; and in another similar experiment, mild small-pox, consisting of large and regular pustules, was produced by matter taken from an eruption which on the face desiccated by the 5th day. One child with four marks from vaccination upon the arms had just recovered from a mild varicella, which left a few light-coloured scars, when she was attacked with the modified small-pox, coming out after seventy-two hours of fever. Wherever cases of this sort have recently happened, there have been two sides of the question, and Dr. Fontaneilles†, as has been already mentioned, referred all those which occurred at Millau to

* Petite Verole chez plus de deux cents Individus vaccinés, observée à Millau en 1817, par M. Pougens, docteur en Médecine de la Faculté de Montpellier, &c.

† Description de la Varicelle qui a régné épidémiquement, et conjointement avec la Variole, dans la Ville de Millau en 1817, par F. P. Fontaneilles.—Similar controversies have existed in other parts of France, Marseilles, Montbelliard, &c.

an irregular varicella, the effect of a contagion distinct from small-pox. This controversy has been attended with some circumstances discreditable to each party; but the principal and important statements of Dr. Pongens remain uncontroverted by his adversary, viz. that what the former regarded as modified small-pox occurred in a person who had shortly before had unequivocal varicella—that the disputed eruption often presented indented pocks and left tubercular elevations of the cutis—that none vaccinated less than five years had it—that the vaccinated were seized with it whilst others were just recovering from the small-pox, and that in other instances it appeared to give rise to the small-pox in those who had not before had either this disease or the cow-pox.

In some parts of Holland the small-pox has been equally destructive, and the exposure of the vaccinated to the existing contagion, has given rise to the same histories and to dissimilar opinions. In Rotterdam, nearly 400 died of the small-pox from April 1817 to June 1818, and, whilst thousands of the vaccinated escaped, and none whose vaccination was authentic had any serious or fatal disease, a few have been described by Dr. Hodenpyl* to have had

Modified
small-pox in
Holland.

* "Observations on the still prevailing epidemic small-pox at

a modified variolous eruption, like small-pox in the precursory symptoms, in the form of the pocks, and sometimes even in duration. Two vaccinated children, and one unvaccinated, in the same family, all had the water-pox. This last he vaccinated effectually, after the water-pox had gone off, and a month or two afterwards, one of the two formerly vaccinated had the disputed eruptive disease. To have had the chicken-pox twice within two months, he says, is unheard of, and therefore the second disease must have been modified small pox, to the accounts of which eruption it bore a resemblance. In general such cases after vaccination were without secondary fever; but this author gives one example, where secondary fever was evident, and the eruption lasted to the 8th or 9th day, although he believed the previous vaccination to have been perfect. Another child in the same family had an eruption which declined on the 5th day, and a third only exhibited a few *petechiae* or spots, that

Rotterdam, by T. G. Hodenpyl, 1818," and "Continuation of Observations, &c. by the same, 1818," in Dutch. These statements have not been received without comment, and Bosch has a Pamphlet "On the small-pox at Rotterdam, giving a view of Vaccination and maintaining it in its proper value."—This disease has prevailed in some other parts of Holland, and an account of its being epidemic at Niemegen in 1817, with remarks on the cow-pox, is contained in the Dutch ΙΠΠΙΟΚΡΑΤΗΣ Magazin, V. 4. p.2.

vanished without forming any prominent vesicles; yet the disease in each occurring at such regular intervals, that he did not doubt its proceeding from the variolous contagion.

In other parts of Europe, I have not learnt that the small-pox has, within these few years, been remarkably prevalent, except in the kingdom of Wirtemburg, an account of which has just been published by Dr. Elsässer *, collected and arranged with much labour, after an examination of all the official returns of the medical men to the government. In every quarter of this territory it seems that there has been small-pox during the four years alluded to, although

Modified
small-pox in
the kingdom
of Wirtem-
burg.

* Beschreibung der Menschen-pocken-senehe, welche in den Jahren 1814, 5, 6, 7 in Königreich Würtemberg geherrscht hat, aus den Acten gezogen von J. A. Elsässer. Stuttgart, 1820.—In speaking of the diseases with which the small-pox was complicated, this author mentions the water-pox, which prevailed often at the same time, so that a child first had the spurious or water-pox, and a week or two afterwards an abundant small-pox. He moreover remarks that it sometimes seemed as if both those diseases were in the same place, some individuals in a family having the water-pox, whilst the rest at the same time laboured under severe small-pox. A child in bad health, who had neither passed through small-pox nor cow-pox, took the water-pox when no small-pox was in the district, and after it went off, irritable ulcers were left and the child died. Instances of small-pox occurring twice to the same person are given in this, as well as in all the other foreign works already quoted in this chapter. The effects of vaccinating whilst small-pox is prevailing, the occurrence of the two diseases together, and many other topics of interest in these matters are to be found in this work, which, next to the recent productions in Great Britain, contains some of the most valuable documents I have met with.

in some proving so benign that not one in fifty died. In many who had not before had this disease nor been vaccinated, it prevailed in so mild a form, that there was no suppuration of the pocks and no secondary fever. The appearances of the eruptive diseases produced in the vaccinated are particularly narrated. A few regular cases of small-pox are allowed to have occurred, but whilst tens of thousands of the vaccinated escaped, two only were ascertained to have died of the small-pox who had been registered as having passed properly through the cow-pox. The variolous contagion, acting upon a small proportion of the vaccinated, produced, therefore, a mitigated or modified disease—the eruption not attaining more than half the size of the regular small-pox—being irregular as to appearance and progress—presenting in some pocks the indentation—unattended by secondary fever, and leaving blotches with convex surfaces on the falling off of the scabs. The interval between the vaccination, and the occurrence of the eruptive disease answering to modified small-pox, varied from five to fifteen years, and was seldom less than the former number. The most extraordinary opinion entertained by this author, is his believing the modified disease not to be communicated by inoculation even to those who have not before had

either small-pox or cow-pox, by which negative quality, he distinguishes it from real small-pox and from chicken-pox. He regards it as an eruptive disease between these two in severity, character and duration, attacking chiefly those who have been vaccinated above five years.

This survey will be sufficient to demonstrate that some attention has been bestowed upon these eruptive diseases abroad, as well as at home; and speaking of them as occurring in the vaccinated, in whom we have the best opportunities of witnessing them, although it will be subsequently shewn that they are not limited to this class of individuals, I shall offer a short account of them, drawn mostly from my own observation, and enriched with the information I have derived from perusing the writings of others.

The general description of any disease must be taken from the character it most commonly assumes, and by which it may most readily be distinguished, the varieties being left for particular histories. In the eruptive disease which has been denominated modified small-pox, the preceding symptoms resemble those of regular small-pox, sometimes trifling and scarcely perceptible, but more often considerable and lasting for three or four days, with a convulsive fit at the onset in children, pain in the back, limbs

and epigastrium, foul white tongue and quick pulse. These symptoms are relieved on the eruption coming out, and if it proves not abundant, the patient walks about in health, and the tongue in two or three days becomes clean. The eruption is commonly first observed on the hands or face but may commence on any other part of the body; it appears as small red spots of inflamed cutis, attended with thickening sufficient to be perceived by the touch. In twenty-four hours, a pimple is to be distinguished, which soon enlarges into a conoidal vesicle, situated upon a slightly elevated basis, and on the third day, circular pocks, indented in the centre exactly like the variolous pock, are intermixed with others less advanced, fresh spots coming out for three or four days. At this time they are firm and resisting to the touch. On the fourth day, some become convex, and resemble small pearls, others remaining indented; and if the pocks are numerous on the face, the eye-lids tumefy, though rarely so much as to prevent vision, the tumefaction subsiding rapidly after twenty or thirty hours. The larger pocks can at this time be ascertained to be cellular, and contain a clear fluid at the summit, and a firm lymph at the basis; and if the whole be taken away, the cutis beneath presents a convex surface.

Usual pro-
gress of the
modified
small pox.

On the trunk, the pocks are interspersed with empty vesicles. The pocks on the face contain a bright yellow fluid, whilst the largest in other parts of the body contain a milky or thick dirty fluid. Without any return of fever the incrustation commences on the third, fourth, or fifth day, and is nearly completed by the sixth, many of the scabs being solid, circular, and the largest not often exceeding $\frac{1}{3}$ of an inch in diameter. The throat during the eruption is sore, and on the second or third day, the tonsils and posterior fauces almost constantly exhibit small yellow circular specks. The scabs fall off in three or four days, and leave tubercular elevations, particularly upon the face and arms. The central depression, where the pocks are numerous, is always evident, in some of them on the third or fourth day. As it disappears in the progress of the eruption, no one is entitled to say it did not exist, if he sees the case only at a late period, nor if he has not examined the eruption in different parts of the body. Its presence proves the pock to be cellular, although its absence does not prove the contrary ; and as there is reason to regard the central depression and cellular structure as indicating eruptions proceeding from the variolous contagion, I hold it of some importance in the diagnosis to ascertain these points, which cannot be

Importance
of ascertaining
the central depre-
ssion.

more readily done than by finding the indentation in some of the eruption. Dr. Monro observes: "the central clear part of the pimples is evidently depressed on the 4th or 5th day, which depression is not to be perceived in all the pimples in the same light, but by turning the body, it can be seen in those vesicular pimples in which it had not been previously perceptible. This fact is generally overlooked, and has often led to the denial of the existence of the central depression, when it was present*". Whenever I have attended to cases during the whole of their course, I have in a small proportion indeed failed to perceive this indentation, even if the eruption has been so fleeting as to incrust in many parts on the third or fourth day, or if there have been, as happens in a majority of cases, not above fifty pocks, the eruption of which was preceded by very slight indisposition, and the whole progress of which did not interrupt the usual amusements or occupations of the patient. But some of the spots advance no further than the first stage of inflammation, others burst and dry up after a little vesicle has been formed upon their tops, and the whole are occasionally intermixed with irregular vesicles consisting of a single cavity; a partial

* Monro on the small-pox, &c. p. 238.

Cautions
about pro-
nouncing the
central de-
pression not
to have been
present.

examination, or a single visit to the patient, may therefore lead to the conclusion that the case did not present the character in question. When the indentation is observed, all agree that it is most marked whilst the contained fluid is clear, and must not be confounded with the depression produced in other eruptions, as the water-pox or the pustules arising from the antimonial ointment, which happens only when incrustation has commenced at the apex.

Considering all the eruptions which I have described in Chap. v. Sect 3. of the first part of this work, as referable to the variolous contagion, and as varieties of the eruptive disease which has obtained the name of modified small-pox, I need not further recapitulate the observations I then made upon the various progress of the pocks in different parts of the body. The circumstances under which many of those cases occurred, and the appearances common to all of them when minutely examined, unavoidably compelled me to refer the whole to the same origin; but I did not add this comment to them, wishing in some measure to separate my descriptions from my opinions, and feeling that the former are correct and must remain, to whatever class of diseases succeeding Nosologists may choose to assign them.

A situation
assigned to
some of the
eruptive dis-
eases which
attacked the
vaccinated
during the
epidemic in
Norwich.

It would be difficult to describe all the

varieties of these or of any other eruptive diseases, without incurring the danger of becoming so prolix as to tire the most patient reader. When the eruption is very numerous, it may be attended by typhoid symptoms, and although the pocks be so abundant, that in regular small-pox they would be confluent, incrustation commences by the fifth day, the secondary fever is entirely wanting, and the declining period of the disease presents a striking variety of blotches which never become prominent, pocks completely incrusted, pimples subsiding without leaving any regular crust, and a few pustules still distended with fluid until the 8th or 10th day. The small flat scabs may in such cases remain for two or three weeks* upon the extremities. The scars left, even in these cases, are very few in proportion to the pocks; they are mostly situated upon the forehead, cheeks or arms, of the colour of the surrounding skin, and not $\frac{1}{8}$ of an inch in diameter, "resembling depressions made in the skin by the head of a large pin†". In very rare instances, such cases have been complicated with petechiæ, the disease declining equally early and rapidly, with safety to

Severer com-
plications of
modified
small-pox.

* "In mild small-pox the scabs fall off usually on the 12th or 14th day, whereas in small-pox after vaccination, they are, as in the malignant small-pox, much longer in falling off; but pits are very rarely left as after malignant small-pox." Monro, p. 243. † Ibid. p. 255.

the patient. They have even been reported to occur in a confluent form, still maintaining a character suited to the quantity of the eruption, and reaching their height so early as the eighth day*. It would almost amount to a fault to mention cases so rare as to have been only just recorded, did they not furnish an argument that the disease may vary as much in mildness, as in severity, from the cases that are more frequently met with. In tracing the milder examples, we find some which were not suspected to belong here, until they were found to originate from the same source and give rise to the same effects. A very few pocks may appear, increase to no more than $\frac{1}{12}$ of an inch in diameter and subside on the 3rd or 4th day, after presenting for a few hours the indented character. Small vesicles, containing very little fluid, may be raised upon thickened bases of the cutis, change their contents into a semi-purulent fluid without attaining any considerable size, and burst and dry up in three or four days without forming a regular solid scab; yet as they still

Mildest varieties of the modified small-pox.

* "In most instances the pustules begin to desiccate on the 3rd or 4th day, in some not till the 5th or 6th, and there have been a few instances in which the eruption was confluent, and did not reach the acme until the 8th day. But even in these cases no secondary fever ensued, and all the symptoms and vestiges of disease vanished with remarkable rapidity, leaving few or no pits." Moore's Hist. of Vaccination, p. 107.

possess some firmness to the touch, resemble the pocks checked in their progress before the period at which they present the indentation, are raised upon thickened and inflamed spots of cutis and leave convex surfaces behind them, it is not improbable, although difficult to be demonstrated, that they are divided into cells, as must be allowed to be the case in the variolous pock at an early period, when it presents an acuminate vesicle. Where the eruption answers to this description, with an absence of the indentation, the spots are not numerous, the indisposition after their appearance is trifling, and the throat is inflamed without in every case presenting yellow specks. It is the occurrence of these with instances better characterized and developed, that has led to a closer examination of them, and to the attempts to establish rules for discriminating them. A rash occasionally precedes or accompanies the most regular cases of modified small-pox ; and the mildest effect of the variolous contagion seems to be shewn in the production of a rash and sore throat without any eruption of vesicles, or of febrile symptoms for a day or two that subside without the appearance of any affection of the cuticular surface*.

* See Pinel, *Nosographie Philosophique*, T. 2. p. 45.—Thomson's *Hist. of the Varioloid Epidemic*, p. 34.—Dewar on small-pox at

Source of the modified small-pox.

Great as these varieties are, it is placed beyond a doubt that the variolous contagion gives rise to them all, and the modified small-pox occurs mostly in those who are, by some natural or artificial protection, rendered incapable of going through the regular small-pox. The contagion proceeding from very mild cases of the modified disease, acting upon a person who has not had either cow-pox or small-pox, will sometimes produce the latter disease with all its horrors *; but its effects are better ascertained by inoculation. If fluid be taken from a mild case, which only presents a few small indented pocks, desiccating in four or five days, it will frequently communicate to a person who has not had either cow-pox or small-pox, a disease identical with the latter and protecting the individual from danger on subsequent exposure to

Effects of contagion of modified small-pox.

Cupar in Fife in 1817, p. 20.—Correspondence of the Dublin cow-pock Institution, p. 10.—Dr. Thomson, describing the different forms of modified small-pox, mentions—fever without any eruption—a rash roseolous and rubeolous—and a few pimples of a red colour and perceptibly hard to the finger, yet never becoming vesicular or pustular. A correspondent of mine in Holland lately noticed in a letter to me the occurrence of a rash and fever in the vaccinated during the prevalence of small-pox; speaking of the appearance of the rash, he says: “erumpit exanthema quod morbillos vel scarlatinam mentitur.”

* Cases of this sort, so mild as to leave their nature doubtful, have been often reported to have introduced small-pox. See Appendix, No. 2.—Edinb. Med. and Surg. Journal, V. 8. p. 55, and V. 1 of new Series, p. 41.—Thomson, on Varioloid Epidemic, p. 278.

the variolous contagion *. Experiments of this sort afford an extraordinary phenomenon, by producing a disease so different in character and severity from the case whence it was derived.

It appears that cases of the modified small-pox, so little advanced as never to present the indentation in any part of the eruption, may likewise produce all these effects by inoculation under the circumstances prescribed. † In a small proportion of the vaccinated, inoculation will succeed in producing the modified disease; in what degree it will affect those who have had the small-pox has not been ascertained. In making the experiment upon those who have had neither cow-pox nor small-pox, it has however been found ‡ that a vesicle on the arm with a rash or a few pimples on the body only will sometimes

Effects of
inoculation
from modifi-
ed small-pox.

* These instances have so accumulated as to make the experiment no longer requisite, and every example of eruption where the pocks are indented may be regarded as *capable*, under proper regulations, of producing regular small-pox by inoculation. See Willan on Vac. Inoc. p. 5, 52, 55, 70.—Adams, Thesis quædam de var. vac. amplectens, p. 33.—Pongens, Petite Verole &c. à Millau, p. 50.—Monro on small-pox after Vac. p. 215. 232.—Hennen in Edinb. Med. and Surg. Journal, V. 14. p. 418.—Sir G. Blane in Med. Chir. Transact. V. 10. P. 2. p. 330.—Medical Repository, V. 13. p. 228.

† This statement is made solely upon the evidence afforded by Dr. Hennen's interesting experiments, who affirms that in the case of his son, none of the eruption was indented, although twelve persons were inoculated from him with effect, in a majority of whom the disease took the course of regular small-pox.

‡ See Part 1, Chap. 5. Sect. 3, & Appendix. No. 2.

be produced, leaving the subject equally liable to small-pox on subsequent exposure, and furnishing a motive for discouraging such attempts without having a sufficient object in view in undertaking them.

*Proportion
of the vacci-
nated who
take modifi-
ed small-pox.*

The numerous recent contributions upon this subject do not enable us to ascertain what proportion of the vaccinated have modified small-pox in any form in consequence of exposure to those labouring under it, or to those having regular small-pox. It has been stated that all those vaccinated above six years will be affected by it, but the writer makes it necessary that the contagion should be applied in *a concentrated* and *lasting form*, which is a condition, it is to be hoped, a few only will be compelled to submit to*. Others have stated one in two hundred, and others one in fifty†. Including the mildest cases, which compose the majority and have been continually regarded as chicken-pox proceeding from the variolous contagion, I believe that not more than one in twenty persons will be in any way affected by the most intimate exposure to small-pox in the same room, and that less than one in fifty will have the disease in a form answering to the generally received description of modified small-pox; but, although I have

* Ed. Med. and Surg. Journal. No. 55. † Monro on small-pox, &c.
p. 201. 204.

undergone some labor in making observations upon this point, my experience has not been sufficiently extensive to enable me to form a calculation worthy of being relied upon. The documents from which I venture to give an opinion are contained in Part 1. Chap. ii. of this work. Considering that these cases occur in the midst of the most destructive small-pox, and that the severer bear a close resemblance to this disease, nothing is more striking than the comparatively little danger which attends them, scarcely an instance being on record in which they have proved fatal; and therefore they must be regarded as vastly milder than the small-pox produced by inoculation.*

Modified
small-pox
almost free
from danger.

It has been shewn that the occurrence of these eruptive diseases is but an exception to a general rule, an immense majority of the vaccinated perfectly and at all times resisting the variolous contagion. Mr. Dunning has observed that "these occasional deviations from seemingly established laws must still be controlled by the

* Pougens' 200 cases of *small-pox* after *vaccination* were without danger. Hugo has given an account of above 50 cases occurring at Crediton, all of which ended favourably. Amongst the numerous examples of modified small-pox amounting to several thousands, related by Adams of Forfar, Dewar, Hodenpyle, Berard, Elsässer, Monro, Thomson, and by various writers in the publications of the two last authors and in periodical works, only two or three cases are reported to have terminated fatally.

Causes of
modified
small-pox.

latter ; and hence appear to us exceptions only because we do not or cannot understand them*". Next to the history of these diseases, the causes of their happening to some and not to others, should therefore be the objects of our inquiry. JENNER† pointed out to us, at an early period, the necessity of the vaccine disease going through all its stages in order to prevent subsequent injury from exposure to the small-pox, remarking that the "constitution loses its susceptibility to small-pox contagion, and its capability of producing the disease in its perfect and ordinary state, in proportion to the degree of perfection which the vaccine pustule has put on in its progress ; and that the small-pox, if taken subsequently, is modified accordingly". This, like most of his opinions, has been supported by the testimony of the most experienced writers, and is indeed rendered probable by the phenomena which attend the occurrence of the two diseases in the same individual, the small-pox being liable to appear at any period previous to the completion of the vaccine disease, although it is generally mild in proportion as the latter is approaching to its termination‡. Incomplete vaccination has consequently been

* Short Detail of some circumstances connected with Vaccine Incubation, p. 8. † Letter to Dr. Willan, February, 1806.

‡ "It appears that, as the vaccine disease advances, the capability

not unreasonably referred to as the cause of modified small-pox ; and the propriety of leaving one vaccine vesicle untouched, to go uninterruptedly through its whole course, was long since suggested by this doctrine.

My own experience has not afforded me any explanation of the vaccinated taking modified small-pox, beyond the probability of its depending upon incomplete vaccination, and the table which I have given, (p. 30) of 500 individuals who presented themselves to be vaccinated, shews that incomplete cases of the disease, from rubbing, accident or other causes, will, amongst the poor at least, happen in as great a proportion as modified small-pox in those who are subsequently exposed to the variolous contagion. Abstracting ichor carelessly from a patient who has only a single vesicle may be one, but is far from the only cause. The modified small-pox has frequently been met with in those who had two scars from the cow-pox ; I have known it where there were three, and others have met with it in those who had four, or even five scars*. Besides interrupting the vesicle by rubbing or the extraction of too much ichor, there are

of the system to be affected by small-pox contagion diminishes more and more, and is not wholly destroyed, until the process is completed by the scab falling off." Richters Specielle Therapie, V. 2. p. 376.

* Hodenpyl, Berard, Pougens and Elsässer.

numerous other causes which may interfere with the progress of the vaccine pock, and which may be disregarded at the time, or subsequently in the absence of a register entirely forgotten, as—diseases preoccupying the system or the surface of the cutis, eruptions, scald-head, teething, prevailing contagious disease, &c.' Hodenpyl, in the few cases of modified small-pox which he has described, believes their cause to have been, diseases occupying the system during the progress of cow-poix—scabies, rickets, scrofula or cancer. Elsässer mentions that in a district where scabies was so endemic that not above one in fifty was free from it, numerous cases of small-pox, both modified and regular, occurred in the vaccinated, and on inquiry it was found out that a child with scabies had been vaccinated, from whom ichor had been taken which produced an irregular and imperfect disease, affording insufficient protection. An author who recently undertook an investigation of the causes of failure of vaccination in Silesia, has related that in 1816 above one hundred who had been vaccinated had small-pox in the same district, and some of them died. It appeared that they had all been vaccinated by the same Surgeon, who was suspended from his appointment as vaccinator, whilst an inquiry was instituted, by a medical committee expressly

appointed, to discover the sources of so much mischief. It was ascertained that the Surgeon had been in the habit of taking ichor as late as the eleventh day, often from vesicles that had been rubbed or scratched so as to be injured in their structure, and had even raised an imperfect scab to obtain what moisture he could from beneath it, to vaccinate with*.

Upon the supposition that a regular and complete course of the vaccine disease is necessary to afford perfect protection—if we take into account the source and state of the lymph employed, as a cause of error; the condition of the patient at the time it is inserted, in regard to local or general disease; the irregular appearances which the spurious pustule may assume; the difficulty of ascertaining whether a constitutional effect be produced, even where the pock on the arm is satisfactory; the interruption to its progress by scratching, rubbing or the careless extraction of ichor; the inattention of patients, and the possibility of an oversight being committed even by medical men—it will be evident that all of those believed to have had the cow-pox ought not to be expected entirely to resist exposure to the variolous contagion.

* Erfahrungsmässige Beleuchtung der neuern Einwurf in betrett der Schutzkraft der Vaccine &c. von Dr. Kausch, in Leignitz.

Periods at
which modi-
fied small-pox
may occur
after vaccina-
tion.

During the epidemic in Norwich I saw no instance of the modified small-pox assuming any degree of severity, where vaccination had been performed less than three years, which I imputed to so small a number having been vaccinated within that period. Dr. Gibson has published a table of what he calls 251 cases of *small-pox* after *vaccination*, from which it appears that by far the greatest number attacked were those vaccinated less than two years*. Dr.

Thomson's varioloid eruptions occurred at various intervals from a few days to fifteen years, not warranting the suspicion, in his judgment, that the preventive or modifying power of the cow-pox was weakened or exhausted by time, but rather that those under ten years were attacked, increasing years appearing in general to lessen the susceptibility to small-pox contagion†. It has been more frequently stated, by writers upon this subject, that those longest vaccinated were not only most likely to contract eruptions from the variolous contagion, but that the severity of these might be estimated by the same rule. If this were correct, it still would not prove that the interval since vaccination was the cause; it would rather indicate that the disease is apt to be more severe in

* Thomson's Hist. of the Varioloid Epidemic, p. 252.

+ Ibid. p. 34.

those past the period of infancy. I should be inclined to say that, after the first few weeks from the completion of the vaccine disease, the modified eruptions may occur at any subsequent time, and that they generally prove less mild in those above three or four years of age than in those who are younger, being very rarely attended with danger at any age.

Taking all the evidence which has been afforded us respecting modified small-pox, we must confess that, in some instances it happens where the local and constitutional effects of the vaccine disease have been, as far as we are capable of ascertaining them, perfect and complete; and we must obviate this difficulty by recollecting that small-pox, naturally or by inoculation, does not always prevent similar effects from future exposure to the variolous contagion.

The similarity between the most modified variolous eruption, and the horn-pock and stone-pock of authors who wrote even before the discovery of inoculation, has lately been recognized and pointed out; and it has been represented that horn-pock is the result of the variolous contagion, acting upon a person who has already had the small-pox; in consequence of which it is proposed to arrange it with the eruption produced from the same cause after cow-

Similarity of
horn-pock
and modified
small-pox.

pox, the whole being regarded as modified small-pox.

Diagnosis of modified small pox.

Modern investigations have created the necessity of fresh diagnostic marks for the distinction of these eruptive diseases, and the modified small-pox (including the horn-pock) being an intermediate disease, neither proceeding according to the course of variola nor varicella, has to be distinguished from each of these contagious disorders. But, in pursuing this subject, it must be understood that varicella is here applied only to the vesicular eruption called crystals or water-pox.

All those cases of modified small-pox in which any of the pocks are observed to be indented upon the surface, whilst their contents are clear, and before incrustation has commenced, are at once distinguished from the water-pox. But it may be desirable to distinguish them before this character is presented, or after it has disappeared, or where an opportunity has not been afforded of watching the progress of the disease. In the first of these cases we must rely upon the one presenting in its early stages a small and firm vesicle, somewhat raised upon a thickened basis of the cutis, containing little fluid, after the evacuation of which an elevation is perceptible on passing the finger over the surface; whilst the other is a delicate and tender vesicle,

soft to the touch, and leaving the cutis smooth and flat on the contained fluid being discharged. At a more advanced period, the former has a clear fluid at the top, and a thick lymph adhering to the basis ; the fluid contents of the latter, when they become turbid, are uniform and of one appearance, because contained in a single cavity. The scabs formed by those pocks that advance to any considerable size are in the modified small-pox solid and circular in some parts of the body ; those formed by the water-pox are minute and shrivelled in comparison of the preceding vesicles, and every where composed of small irregular masses. Those cases of the modified disease in which the pocks never advance so far as to become indented in any part of the body, are, on account of being intermixed with simple vesicles, to be discriminated from water-pox with much difficulty, but their greater firmness, and less rapid growth, (although equally short duration,) may afford some assistance in the diagnosis : an elevation, or a convex surface of the cutis occurring only in a few of them, after the scabs separate, will determine the question, because the water-pox, consisting of vesicles of a single cavity, and having no firm lymph effused at the basis, always presents a flat surface of the cutis when examined at any period of the progress of the

Diagnosis be-
tween modi-
fied small-pox
and water-
pox.

eruption. The few scars left by modified small-pox in all those cases where the pocks have been indented are minute and the color of the surrounding skin ; but no advantage is derivable from an examination of the scars in milder cases, because none are left, unless produced by scratching, when they resemble those of the water-pox, being lighter in color than the surrounding skin and often big as the flat surface of a split pea. In general the remarks applied to these two diseases, will equally contribute to distinguish the water-pox from small-pox.

The modified small-pox continually resembles the water-pox in mildness of symptoms, in scarcity of eruption, in a succession of vesicles and in shortness of duration ; and the points in which it comes the nearest to the water-pox are those by which it is chiefly distinguishable from the small-pox.

The contrast which the modified small-pox makes with regular variola has been shewn as clearly as I was able to do it in the first part of this work. (Chap. v. Sect. 3.) It has generally been stated that the severest cases of varicella are to be compared with the mildest cases of small-pox, to shew the closeness of their resemblance, and to give an opportunity of exercising the nicest marks of distinction. This may be applicable to the water-pox, but is by no means

so in regard to modified small-pox, and it has appeared to me, that in treating of the diagnosis between the latter and regular variola, we ought always to have an eye to *the quantity* of the eruption.

Modified and regular small-pox closely resemble each other in the precursory symptoms, and in the form and structure of the pocks at a certain period; the differences between them are chiefly in the coming out and progress of the eruption. A vesicle may be seen in the former 24 hours after the first appearance of minute red spots; the largest pocks seldom exceed $\frac{1}{4}$ of an inch in diameter; the size of the scabs bears a proportion to them, and the scabbing is accomplished at different periods from three to eight days, the former being the period of its happening where the eruption is scanty, and the latter where it is most abundant, even confluent; a few of the pocks only advance to an imperfect suppuration, the rest being checked in their progress, remaining as spots or pimples, or incrusting whilst their contents are transparent; where the pocks are numerous, tumefaction of the face takes place two or three days earlier than in small-pox, and is not followed by tumefaction of the hands. The pocks are not encircled by a red ring, and the severest cases of the disease subside rapidly and sud-

denly on the 5th or 6th day without secondary fever, the patient walking about in health at the very time when danger would be feared in a severe case of regular small-pox. The quick and irregular progress of all the stages of the severest cases of modified small-pox do therefore sufficiently distinguish it from small-pox with the same quantity of eruption, which in a practical point of view is of the first importance; but the mildest instances of the disease it will probably be ever difficult to decide upon, except we refer to the individuals in whom they occur, because the variolous contagion, acting on those who have never had either cow-pox or small-pox, will produce occasionally a few pocks which attain but a small-size and quickly desiccate with little inconvenience, or will in some persons cause indisposition for a time without any general eruption. Such confusion only happens in regard to mild cases with a very few eruptive spots upon the skin, and do not affect in any degree the importance of a diagnosis between severer cases, nor prove that it is impracticable. The scars of the modified disease differ from those of small-pox only in their diminutive size, and in being very few in number however abundant the eruption.

I have applied *modified small-pox* to certain eruptive diseases which have accompanied the

variolous epidemic, and which appeared to proceed from it, because it has of late been the custom so to employ it in England ; but it cannot fail to be observed that the meaning of this term has been greatly extended by modern investigations upon the subject, horn-pock being included in it, and even milder eruptions which in other countries are continually denominated chicken-pox. It was first used exclusively, and very properly, to signify the mitigated variolous eruption occurring in the vaccinated, and cow-pox was supposed to be the modifying power ; but now we have modified small-pox from previous small-pox, as well as from cow-pox, and even modified small-pox in persons who never had either the one or the other of those diseases. Every case of small-pox may thus be said to be modified by some unknown cause, or else, the same contagion operating, the same effects would be produced. It may be proper successively to invent, employ and relinquish terms, according to circumstances ; and if the word *modified* cannot be used in reference to the modifying power, in what respect is it better than *spurious* or *varicellous*, or any other term that has been invented to designate eruptions connected with small-pox in history or diagnosis ?

Although I have objected to the doctrines of those authors who have described all the eruptive

Objections to
the term
modified
small-pox.

diseases, which I have particularly considered in this chapter, as *varicella*, because it was not at the same time acknowledged that they were produced directly by the variolous contagion, and were most liable to happen in one class of individuals, nor that there was any thing new in the frequency of their occurrence and the severity they sometimes assume, I still believe that term to be strictly applicable to them : they are indeed *varicella*, or small-pox diminished, and are better designated by this title, than by *small-pox* with the strongest epithet prefixed to it.

Reasons for
classing modified
small-pox as vari-
cella.

I can offer many reasons in palliation of this apparent innovation. All the forms of varicella have at various times been classed as small-pox ; and on the other hand eruptions, acknowledged to proceed from variolous contagion by the most modern writers, were formerly regarded as varicella. In those parts of the continent where this disease is acknowledged sometimes to present pocks indented in the centre, modified small-pox has been very seldom met with. The mildest cases of modified small-pox are not incompatible with the descriptions of chicken-pox by the most esteemed modern authors in England, and several of them, in speaking of the former, have introduced a description of the latter, feeling no doubt that it fell in more readily with chicken-pox than small-pox. It has

even been proposed to call modified small-pox *varicella vaccinia**, but, from its not occurring exclusively in the vaccinated, such an appellation must be rejected. If we exclude all eruptions proceeding from the variolous contagion, in my belief we shall have no varicella with indented pocks, (which many have insisted on,) nor shall we find it attacking a considerable proportion of individuals twice in their lives, with an interval only of a few weeks, which the testimony of various writers has lately authenticated, and which was described to have happened before cow-pox was heard of. But I need not offer more arguments in behalf of a proposition which will certainly be rejected if unjust and likely to be of no utility. Had all writers agreed upon the nature of the eruptions to which varicella should be applied, no new suggestion would be needed; but there appears enough of variety in the opinions and descriptions of modern, as well as of ancient writers, to excuse any proposal for classifying anew these diseases, provided it may tend to remove controversy. I propose, therefore, to make two divisions of varicella, naming each according to the structure of the eruption.

1. VARICELLA CELLULOSA. The fluid of the

* Allgemeine Litteratur-zeitung, Feb. 1819. p. 222.

eruption contained mostly in separate cells ; the pocks often depressed in the centre, but sometimes presenting only conoidal and firm vesicles placed upon a thickened basis of the cutis ; incrustation taking place, without secondary fever, at various periods from the third to the seventh day ; scabs mostly flat and circular, and on falling off leaving tubercular elevations, or convex surfaces of the cutis. It is produced by the variolous contagion, occurs sometimes after natural and inoculated small-pox, but more frequently after cow-pox. Its contagion may give rise to small-pox in those liable to that disorder, and it is capable of being inoculated, producing sometimes regular small-pox and at others an incomplete and non-protecting disease. (*Synonyma. Stone-pock, horn-pock, modified small-pox, pemphygus variolodes solidescens, chicken-pox, varicella.*)

*Varicella
Cellulosa.*

2. **VARICELLA BULLOSA.** The fluid every where contained in vesicles composed of one cavity ; the covering of the contained fluid delicate and easily broken ; drying into small irregular crusts from the third to fifth day, and on falling off, leaving in every part a plane surface of the cuticle ; rarely leaving pits except from scratching, when the scars are large and lighter in colour than the surrounding skin. It is doubtful if this eruption proceed from the variolous

*Varicella
Bullosa.*

contagion; certain that it does not give rise to small-pox, and that it maintains the same character in all classes, whether occurring before or after cow-pox and small-pox; very contagious and affecting a majority of people once during life; probably not communicable by inoculation. (*Synonyma. Crystals; water-pox; varicella; chicken-pox; pemphygus variolodes vesicularis; mild vesicular small-pox.*)

After repeatedly contrasting and describing these two divisions of varicella, I forego a longer account of them. It is often more easy to write the history of a disease than to classify it. The aim and end of all classification is practical utility and the extension of a knowledge of diseases, and very arbitrary arrangements have been accepted if either of these views were answered thereby. The arrangement I have offered seems to shew how a person may have varicella twice at a long or short interval; how this happens to a certain proportion only, and not to all; how some, looking to the former species, have regarded varicella as arising from the variolous contagion and as being communicable by inoculation; how others, looking to the latter, have made the incapability of inoculation a criterion of the disease, denying that it ever offers pocks depressed in the centre; and how a few, looking to both without

Practical utility
the aim of
classification.

distinguishing between them, have asserted that varicella, of whatever character, is capable of giving rise to regular small-pox in those not previously protected against it.

I am sensible of many difficulties and objections that attend the above classification, and can only hope that some advantages may be found in it that may counterbalance them.

Difficulties in proposing an arrangement free from objections.

In the present state of our knowledge, I do not believe it possible to propose an arrangement free from objections, and I have no doubt that, until a less imperfect one shall be formed, the medical public will receive a suggestion for a nosological arrangement, offered to them without presumption, if there be the smallest prospect of its producing any practical benefit.

Si de rebus constat, facile de verbis conveniri potest.

In turning to this subject, my mind has been intent upon the discovery of the laws and characters of the eruptions proceeding from the variolous contagion, without any presentiment of the conclusions I might come to, being of opinion that truth is never to be shunned nor feared, and that the cause of vaccination cannot be more properly supported, than by an active, open and impartial inquiry into the results of above twenty years' experience in the practice of it.

CHAPTER IV.

Of Variolous Inoculation, and the means of discouraging it.

IN considering the merits or demerits of variolous inoculation, we must constantly compare it with vaccination. This comparison ought not to be limited to the exact degree of protection afforded by each against the small-pox, (for both will in rare instances fail,) but should be carried to other important points—the facility of their adoption—the possibility of their universal extension—the progress made by each in a series of years—the effects produced upon the bills of mortality and upon population. It is lamentable that there should be any occasion to prosecute these subjects in the present day, however easy it may be to collect materials for the purpose.

Comparison
of variolous
inoculation
and of vacci-
nation.

During the first eight years after the introduction of variolous inoculation into England, only

Early progress and effect of variolous inoculation.

897 individuals*, submitted to the operation, of whom 17 died. Its adoption in other countries was even slower and less extensive; in some it was not employed for above half a century, and in others, from its disastrous effects in spreading the contagion, it was actually prohibited by an act of the legislature. The establishing of the Small-pox hospital in London in 1746 gave great encouragement to the practice by shewing the small mortality amongst the inoculated under the best management; but from the impossibility of making it general, the means which protected some, brought others into danger, individuals were saved at the expense of the public, and from the best evidence that could be obtained when the debate took place in the British parliament† respecting a reward to the illustrious JENNER for his discovery, it appeared that 36,000 individuals annually perished from the small-pox in the united kingdom, at the very time when the practice of variolous inoculation had been brought to its greatest perfection, and when it had been perhaps embraced by a larger proportion of persons than in any other country.

Dangers as well as difficulties have therefore

* Woodville's History of Inoculation. p. 184.

† Debate in the House of Commons, July 1806.

accompanied this practice, and the actual number of deaths has been rather increased than diminished by it. Sir Gilbert Blane* has recently illustrated this fact by a table of the deaths from small-pox in London, taken at four different periods of fifteen years each. The first of these periods includes 15 years preceding variolous inoculation; the second, fifteen years after the complete introduction of it; the third refers to the same length of time before vaccination was discovered, and the fourth embraces 15 years since vaccination has been pretty extensively practised. The ratio of deaths from small-pox to the total number of deaths is given in the table alluded to as follows :

Effects of variolous inoculation upon mortality from small-pox in London.

First Period from 1706 to 1720, 79 in 1000

Second ditto, —— 1745 — 1759, 89 — 1000

Third ditto, —— 1785 — 1798, 94 — 1000

Fourth ditto, —— 1805 — 1818, 53 — 1000

* Medico-Chirurgical Transactions, V. 10. P. 2. p. 3.—This is not a new doctrine as to the effects of inoculation; it was stated in other words by a philanthropic writer shortly before the discovery of vaccination. “As far as my circle of observation extends, both in England and Wales, this improved method of communicating the distemper has manifestly appeared to be injurious to the poor, though eminently useful to the rich. It has become prejudicial to the community, though human nature never bestowed so valuable a blessing as it confers on the few intelligent individuals who adopt it. This consideration ought to have great weight; and in one of the most

These calculations are made from the bills of mortality in London ; and, applying them to the whole population, Sir Gilbert Blane estimates 23,134 lives to have been saved by vaccination during the fifteen years of the last period, "in the metropolis of that country which has less adopted vaccination than any other civilized country in the world."

Deaths in
small-pox
Hospital dur-
ing inocula-
tion and vac-
cination.

It is not possible to refer to any extensive documents upon the subject without obtaining evidence of the same kind. My friend Dr. Ashburner, physician to the small-pox hospital in London* has furnished me with a report presented by him to the Governors of that

enlightened nations of Europe, it occasioned a prohibition of inoculation in large towns, which has never been repealed." Haygarth's *Sketch of a plan for exterminating the casual small-pox from Great Britain*. Introduction, p. 36. (1793.)

* Out-patients were formerly inoculated at this hospital, and the practice was not discontinued until 1808. Inoculation is still performed upon those who choose to be admitted for the purpose, but the number has been small, 691 only having been inoculated as in-patients from May 1808 to December 1819; of these, 34 were inoculated in 1818, and 44 in 1819. Although the amount is so trifling, it must remain a subject of regret that a practice, discouraged by every associated body of medical men in the universe, and prohibited under severe penalties in half the nations in Europe, should be apparently sanctioned by a charitable institution, originally established with the most humane views, and supported by individuals of the greatest benevolence. I have been informed of the small-pox being twice brought into the neighbourhood of Norwich, by patients discharged from this Institution, the contagion being probably conveyed by their woollen-apparel, which had undergone no purification previous to their dismissal.

institution in December 1818, containing the number of deaths amongst the variolous patients admitted twenty years before, and twenty years since the practice of vaccination, which shews that

from 1779 to 1798 the deaths were 1867
— 1799 — 1818 814

fewer deaths by 1053 having taken place during the last twenty years, although there has been the same facility of admission of patients labouring under the disease. From the diminished number of applicants, a portion of this hospital has been converted to another charitable purpose.

A comparison of the extent of variolous inoculation and of vaccination may also be drawn from an examination of the records of this institution: from its first being opened for the reception of patients, to the end of the year 1819, including a period of 73 years, the average number annually inoculated for small-pox was 658; whilst, during a period of 21 years, from the introduction of the practice of vaccination to the end of the year 1819, the average number vaccinated annually was 2224. A few facts of this sort, exhibiting what has actually been effected, even in this country, where vaccination has received the least support, and

Difference in extent of the practice of inoculation and vaccination.

NOTE.—Instead of the blank line in the table of the following page read “during vaccination, from 1808 to 1817.”

inoculation been the least discouraged, speak more forcibly than any speculation as to what *might* be done by one method or the other.

I am further enabled to add a document equally incontrovertible as to the comparative effects of the two practices in question upon the occurrence of small-pox, through the kindness of Dr. Bremer of Berlin, who has favoured me with more valuable information than the limits I wish to prescribe to this short treatise will permit me to introduce. This celebrated Physician and Vaccinator has arranged a table of the deaths from small-pox in Berlin before and since the practice of vaccination, from which it appears that the numbers sacrificed to that disease were :

during inoculation, from 1790 to 1799	4117
— — — — —	1808 — 1817 1367

giving a diminution of 2750 in the number of deaths during the latter period.

In reviewing the history of inoculation previous to the discovery of vaccination, I have not found that any country ever made laws to foster and encourage it, directly or indirectly, but that some have enacted laws prohibiting it. Neither have I met with any account of inoculation being universally adopted in an extensive district so as to exclude the fatal effects of the

Comparative mortality from small-pox in Berlin during inoculation and vaccination.

casual small-pox, although the advantages of the practice were trumpeted throughout the world for nearly four-score years. I have moreover adduced proofs, that the partial adoption of it, by extending the contagion to those who might otherwise have escaped, actually increased the mortality produced by the most destructive of maladies. How differently the effects of vaccination have been estimated in all these respects, will be cursorily set forth in the following chapter.

Inoculation is far from safe to the individual who submits to it. It may be true that not above one in two or three hundred dies of inoculation, when conducted by medical men and practised upon those in health, after proper preparation; but it gives very different results, when adopted to check a prevailing disease, and when performed by ignorant people, upon the healthful and the unhealthful, without precaution. The most strenuous inoculators have always admitted thus much, by attributing their success to their own skill and judgment, and not to the mildness of the means employed: but no one ever asserted that cow-pox, even when unwatched, was likely to become a dangerous disease. Inoculation is also liable to fail in protecting against future small-pox, a proportion of the inoculated taking a severe

Dangerous
effects of va-
riolous inocu-
lation.

Inoculation
does not al-
ways protect
against small-
pox.

or even fatal disease from subsequent exposure to the variolous contagion. These topics I merely enumerate in this place, because the evidence by which they are supported is contained in other parts of this treatise*. If a thousand individuals submit to variolous inoculation, it is as if they had drawn lots to determine who amongst them should be sacrificed, that the remainder, after much suffering, might escape with their lives—a measure never attempted to be justified except in extreme cases, and where there was no other chance of avoiding the impending danger.

At various times, since the discovery of vaccination, plans have been offered for checking the spreading of the small-pox in Great Britain†, and restricting the practice of variolous inoculation. These plans have been adopted in other countries, and contributed to save the lives and maintain the health of their inhabitants; the effects of the total neglect‡ of them in our

* For the severe and fatal effects of inoculated small-pox, particularly amongst the poor, and for examples of those who after having submitted to inoculation have subsequently taken small-pox, and in several instances died of it, see Part I. Chap. 1. and Appendix No. 2. containing the substance of a correspondence with practitioners in Norfolk, &c.

† See the Ed. Med. and Surg. Journal, V. 4. p. 389. Also Mr. Bryce's plan, and the more recent observations of Professor Monro.

‡ There are no laws in England that directly and exclusively apply to this subject. The individual who propagates small-pox is liable

own country have been fully witnessed and vainly deplored during the prevalence of the small-pox in Norwich and the adjoining counties. Magistrates and respectable individuals have regretted that no precautionary restrictions could be enjoined to those labouring under the disease, who exposed themselves in the streets and on the public roads at all times of the day. Itinerant inoculators, irregular practitioners and old women introduced and extended the disease to all quarters by inoculation, regardless of the admonitions given to them, because the law authorized no direct measures against them. These disastrous effects were most severely felt in the county of Norfolk, the disease being thus continually introduced into parishes previously free from it; and these consequences of the practice were made the subject of a representation to a grand Jury*, some of the magistrates of which body attempted without success to

Necessity for
legislative in-
terference re-
specting the
spreading of
small-pox.

to an action for a misdemeanor; but, frequent as the offence has been, and fatal as have been its consequences, the law against it has, to the best of my knowledge, been only in a single instance applied: the example was a parent who carried her child through the streets of London, whilst labouring under small-pox, from which *eleven* persons took the disease and *eight* of them died.

*“It was stated that in a Hundred consisting of 22 Parishes, 19 had small-pox, and that in 12 of these they were inoculating gratuitously. It also appeared that several persons of the lower class, some of them inhabitants of Work-houses, were going about the country inoculating.” Norwich Mercury, July, 1812.

inflict punishment upon the ignorant persons who wantonly committed so great an injury against the public. Many medical men*, desirous of doing their duty by discouraging variolous inoculation, have been placed in the most unpleasant situations, and not unfrequently have been compelled to commit an act which they believed to be immoral and injurious, because they could not afford to sacrifice the small emolument arising from it; some have reluctantly inoculated whole parishes of the poor, at the instigation or order of an overseer, who probably did not know but the cow-pox was as contagious as the small-pox. It is lamentable indeed if the legislature cannot justly interpose to correct evils and abuses, the existence of which has been felt and acknowledged by a very great proportion of the community.

In establishing any regulations upon this subject a view must be had to the nature of the government and the habits of the people. If, in a free country, there be not a general feeling in favor of a new law, it will either be neglected, or badly executed, and in either case, fail to answer the object intended.

* See Appendix No. 2. for an account of the small proportion of medical men who inoculate *from choice*, the great proportion who have done it unwillingly and from necessity, and the numerous places into which the small-pox has been thus introduced by old women, irregular practitioners or itinerant inoculators.

It is obvious that no direct measures can be taken to compel individuals to avoid exposing themselves to the variolous contagion. If suicide be attempted unsuccessfully, there is no law to punish the offender ; and to rush unprotected into the centre of the contagion of small-pox, if not actually suicide, is equal to an attempt at it. The restrictions must therefore be upon the individual already labouring under the disease, and all additional measures must be directed to proclaiming the danger.

The public have surely a right to be informed of the introduction of so great an enemy as the small-pox amongst them, and the parents, nurses or medical attendant of any individual discovered to have this pestilential disease, in any court, street, town or parish where it did not before exist, might be required under a penalty to give information of the same to a magistrate, who should be provided with a regular form for proclaiming the situation and nature of the contagion, the dangers attending it, and the means of avoiding them. Every parish, town or hundred should have a building or rooms for the reception of variolous patients, who might have the choice of being insulated there, or at their own houses, until the period is past when they are capable of communicating the infection, but who should be prevented, by penalty, from

Regulations respecting the variolous contagion.

exposing themselves abroad before that time, and liable to an action for the injury that ensued. How far the plans proposed for insulating variolous patients would be acceptable in England I am not qualified to determine, but our laws are as severe as those of any other country respecting a pestilential disease that has been much less inimical to human existence; for "we should probably," as Sir Gilbert Blane observes, "be within the truth in asserting, that small-pox has destroyed a hundred for every one that has perished by the plague."

In restricting variolous inoculation, we have the example of other countries before, as well as since, the discovery of vaccination*. Independent of this, the effects which have attended the practice of inoculation at all times, offer powerful motives for discouraging it. Formerly it was the boon of the rich and the scourge of the poor; it is now by comparison to be regarded detrimental to all classes, and those who are deluded into the adoption of it commonly do it through ignorance or prejudice, not knowing what they do.

Regulations
respecting va-
riolous inocu-
lation.

Laws are most readily submitted to by being

* It has been stated that a law existed in Virginia, interdicting inoculation for the small-pox, unless permission were first obtained from the justices, and from all the neighbours within a district of two miles. *Ring*, p. 685.

placed in a proper light. When the misdeed itself brings certain punishment upon the offender, laws are less necessary to prevent or discourage it; but variolous inoculation (compared with the casual small-pox) endangers less the individual who submits to it than the public. It is not that a person ought not to inoculate or be inoculated, but that he is forbidden to injure his neighbours, or to introduce and extend a pestilence by inoculation. The operator and patient come equally within this explanation, and to both we ought to extend a law, prohibiting inoculation, by a severe penalty, except under the following circumstances: where the patient is wholly secluded so as to prevent the possibility of the disease spreading—where small-pox is already in the family—where it breaks out in a family and vaccine ichor cannot be obtained within two or three days—when the individual is believed to have previously passed through cow-pox or small-pox—or where vaccination has been repeatedly practised without effect. If the variolous disease supervene, in consequence of inoculation under these circumstances, the patient is to be placed under the same restrictions as if he had the casual small-pox.

The medical profession, with the exception of about one-fiftieth part, would, I am convinced,

Circumstances under which variolous inoculation might be permitted.

Public feeling
in favour of
laws to check
the spreading
of small-pox.

rejoice at an act from the legislature, discouraging variolous inoculation, and relieving them from the dilemma, in which they are placed, (more particularly in provincial situations,) as often as the small-pox happens to prevail; and it can be attributed only to a want of sufficient information and ability on my part, if I fail to make it apparent that some salutary regulations upon the subject would be well received in every quarter of the kingdom, and steadily enforced as being conducive to public comfort and individual safety.

C H A P T E R V.

Of Vaccination, and the means of promoting it.

THIS term strictly means the inserting of vaccine ichor to produce the cow-pox, but it is often employed to signify the whole course of the disease, and this double meaning has been occasionally the source of error and of evil reports. The illustrious JENNER discovered *vaccination*; the *cow-pox* had been known long before his time.

Definition of
the term.

We may consider cow-pox in two views; *first*, its real efficacy in protecting against small-pox, where the disease goes through its entire and regular course; and *secondly*, its practical efficacy, when applied to a large number of individuals. In the former instance, there is very little proof against its affording a degree of security that approaches to perfect safety; and should it be otherwise, our utmost researches

*Distinction
between the
real and prac-
tical efficacy
of cow-pox.*

could only ascertain the fact, without enabling us to alter it. In the latter instance, the cow-pox is acknowledged to be liable to many exceptions in preventing small-pox ; and these it should be our principal study to find out, because many of them may be avoided, inasmuch as they probably arise out of the mildness of the disease, and are in some cases to be attributed to the carelessness of the patient or the practitioner.

*Uniform pro-
gress of the
disease.*

When we reflect how greatly the same eruptive disease varies in different individuals, we must be surprized that the cow-pox is generally so regular and uniform in its appearances ; indeed we may say, that there is no disease which maintains so nearly the same character and intensity in so great a proportion of those affected by it, and were this not the case, the practical efficacy of cow-pox must be still further diminished, the local appearances which the disease assumes being the principal grounds by which we judge of its proving adequate to the preventing of small-pox.

Upon no subjects is it more important that information should be diffused than upon the laws, characters and anomalies of the cow-pox, because every Surgeon has to practice vaccination, and unanimity in the medical profession, which is likely to obtain in proportion as information is extended and the process carefully

conducted, must go far with the public in making them submit implicitly to its adoption.

The progress of the genuine vaccine-pock has been so well described, that a further account of it would be useless repetition. Where the vesicle has risen properly, the areola formed at the right time and all the local appearances have been presented which are regarded as characteristic, it has been stated on the best authority, that the system has felt the influence of the local disease, and will afterwards resist small-pox, and if these appearances, occurring in an individual previously in health, and in whom no other disease has supervened during the cow-pox, are not to be relied upon, we shall frequently be unable to give a decided opinion. The symptomatic fever, taking place sometimes before, and more often during the formation of the areola, must in infants be guessed at, and in those who are older cannot always be observed. The soreness in the axilla, which is scarcely to be detected in infants, may be held as proof of constitutional affection, when accompanying a regular pock on the arm, but takes place also from a spurious pock or a pus-tule. The third sign, by which it has been attempted to prove constitutional effect from a regular vaccine pock, is the inserting of ichor afresh on the 5th day, giving rise to a pock of a

Signs of con-
stitutional ef-
fect from
cow-pox.

diminutive size, which incrusts as early as the original one. A failure of this experiment, which will happen in perhaps a majority of cases, proves nothing; when it succeeds, and the original vesicle takes a perfect course, it is doubtless the best test that we have; but is it not possible that too much has been ascribed to it? has it not been assumed to indicate the exact effect upon the system which enables it to resist subsequent exposure to the variolous contagion? whereas it will succeed where the original pock is injured considerably in its progress, and left in such a state that future vaccination would be prudent and adviseable.

Circumstances under
which it is
imperative to
re-vaccinate.

Where a regular vaccine pock is injured by rubbing or accident—where the disease takes a spurious or irregular character—where the system was preoccupied by any disease—where any disease supervened during the progress of the cow-pox—where the scar left is feeble and not indented—in all these cases, a repetition of the vaccination ought to be strongly recommended, and should it fail, as will often happen, the doubt implied by the attempt will be held in recollection at a future time. Re-vaccination in all doubtful cases is of the greatest value, and is to be recommended in preference to variolous inoculation, which should only be practised whilst small-pox is prevailing. The foveolous

scar left by the vaccine pock, only shews the latter to have risen and advanced considerably in that spot, but does not prove that it went through its regular course without rupture or injury, since the most strongly marked scars which I have observed, have been those where an abundance of ichor had been incautiously extracted.

The duties of the medical man are of so much consequence in regard to vaccination, that every occasion should be taken to remind him of them; they are included in the obtaining of ichor, choosing a proper subject, watching the disease throughout its whole progress and repeating the operation in all doubtful cases.

Ichor should be taken whilst it is perfectly limpid, from a genuine vesicle, on the eighth or ninth day, just before or during the formation of the areola; the patient furnishing it ought to be free from cutaneous eruption or constitutional disease. Arrangement should as far as possible be made to vaccinate from arm to arm. If the ichor be kept upon a lancet, it must be used within forty-eight hours. In general, it is more convenient to receive it upon points of quill or ivory, which should be left to dry for a few minutes and be corked up closely in a small phial. In a practice so universal, and requiring to be economically performed because the poor

Precautions
in obtaining
Ichor for
vaccinating.

are the subjects of it as much as the rich, the simplest means of taking and preserving the lymph will in the end be most useful. The ichor is most easily received upon plates of glass, but is neither so convenient to be employed nor so effectual.

The most eligible time for vaccinating is from the beginning of the third to the termination of the sixth month, or previous to the commencement of teething. If there be not immediate danger of small-pox, the operation should be deferred in all cases where there is any local or general disease. Every surgeon, who undertakes to vaccinate many of the poor, will best consult his own comfort, and obviate some of the mistakes which the mildness of the cow-pox may occasion, by keeping a register* of

Keeping a
register of the
vaccinated.

* The results of extensive registers of the vaccinated have not been fully given in England. Those which have been published by public Institutions do not give all the particulars that make a register valuable, as, the proportion of patients who discontinued to attend, the cases in which the operation is repeated on account of injured and irregular and spurious pustule, or of total failure. The limited number which I have noticed in my register (p. 30) will shew some of the deductions derivable from this source. In the following pages, I have made a short extract from a foreign work to this purpose. It is mentioned by Dr. Bullen of Cork (in the correspondence of the Dublin Cow-pox Institution p. 7.) that of 4330 whom he registered and vaccinated, only 1693 went through the disease satisfactorily, many not returning after ichor was inserted into the arm, and fifty of those which did return having a doubtful disease. These results correspond very badly with the opinions hazarded by some writers. Dr.

the progress of the disease. When small-pox is prevailing, the making of at least four punctures should be regarded as an indispensable duty, because a failure of the operation, at all times injurious, may at such a time leave the patient a victim to the existing contagion. In vaccinating the poor, it is prudent always to make the same number, as it is more likely to prevent failure in the first instance, to guard against accidents from rubbing, to afford a supply of ichor without injury to every vesicle, to give additional opportunities of judging of the regularity of the disease and to cause an evident and satisfactory degree of symptomatic fever. If any of the four punctures fail, fresh ichor should be inserted on the fifth day in the hope of producing the test-vesicles after the manner recommended by Mr. Bryce; but the making of a single puncture originally, and opening the vesicle thus produced on the fifth or sixth day, in order to obtain ichor for testing,

Method of
vaccinating.

Dewar has observed "the symptoms of the cow-pox are easily learned and distinguished," which is true enough, but does not affect the observation that the disease is easily interrupted, and that its mildness may make the Surgeon or patient so inattentive as to prevent the former from embracing fit opportunities of distinguishing it, after he has learnt to do so. The same writer says: "I have not found any instance of a repetition of the operation, even by a medical man, except when no vesicle appeared. When a vesicle was produced, it seems *in almost every case* to have gone through its stages *with great regularity.*" Dewar on epidemic small-pox at Cupar in Fife, 1817. p. 30.

Care in
watching the
progress of
the disease.

I should regard as being far from the most advisable method of vaccinating that has been suggested, as it is liable in the hands of incautious practitioners, to all those abuses from the extraction of ichor from a single vesicle, which have been so often dwelt upon by the best writers about the cow-pox. Although I believe that a single and perfect vesicle will commonly afford as complete protection as several, and that a delicate puncture in it so as to allow a little lymph to exude will not materially interrupt its progress, yet so much mischief has arisen from the abuse of this practice, that it is far better to avoid temptation by making a rule never to open a single vesicle, and always to endeavour to leave one or two entire. To nip, and pinch, and squeeze a vesicle, with the desire to obtain the last drop of ichor, is most reprehensible, and to break up pocks at all stages and then assure parents of the safety of their children, as some are represented formerly to have done *, is, in the present state of our knowledge,

* See the Med. and Phys. Journal, V. 13. p. 545. These are nearly the words used by Dr. Walker, the same gentleman I believe, who is at present director of the "London Vaccine Institution." I recommend Surgeons in the country not to apply by mistake to this establishment with a view to obtain genuine ichor *free of expense*, as they will have to pay postage for all letters sent and received, and very probably be saddled with the expense of an *honorary diploma into the bargain*.

a breach of faith to the public, and will account for reputed failures in many of those who were vaccinated at an early period. In puncturing a vesicle to procure ichor, the lancet should be held nearly horizontally, and not passed so deep as the basis of the pock; neither should the vesicle be opened repeatedly at considerable intervals*. The attention of the Surgeon is not to be confined to an inspection of the patient at the time the areola is forming, but should also be directed to the giving of such advice as will prevent injury to the delicate vesicle in all its stages. By considering every interruption to the local disease as a failure *in the cow-pox itself*, we shall certainly have fewer failures to report *after the cow-pox*.

For my own part, I have endeavoured to represent fairly all the facts in my possession that bear upon the practical and real efficacy of this disease in preventing small-pox, and I do not think that the liability of a small proportion of

The general practice of vaccination not affected by the failures which have been reported.

* A zealous advocate of Vaccination has attributed failure to twice opening the vesicle. With ichor taken from the vesicle in the morning, a child was vaccinated and had a regular disease; the inflammation excited by this injury so altered the contents of the vesicle, that they were no longer vaccine lymph, and fluid taken from it in the evening produced a spurious disease in a second child. Both these children were, after some years, exposed to the small-pox, and the latter took the disease whilst the former escaped. *Golden's Second Report of the Bucks and Berks Vaccine Institution*, p. 26. 1818.

the vaccinated to be affected by exposure to the variolous contagion can be urged against the practice, unless it were made evident that there was within our reach some other method more effectual, and equally easy of application. Inoculators for the small-pox have no doubt regretted that complete protection was not in every case afforded against a subsequent attack of the disease, which occurrence has led them into doubts and difficulties requiring all their ingenuity to remove and explain. In supporting the general utility of cow-pox, we are less embarrassed, because the extent of the practice affords abundant documents to prove the millions of lives that have been saved by it, and to shew that its exterminating power, in regard to small-pox, has not been affected by any of the facts and arguments which have been brought forward. The exceptions to the protection afforded by vaccination, so far from offering any discouragement to the practice, seem rather to furnish an additional motive to make it more general, that it may be conducted under fewer disadvantages, and all the beneficial effects be derived from it which it is capable of affording.

If no direct measures can be taken in a free country to insure the general practice of vaccination, various expedients may be used for the encouragement of it. The legislature would do

much in its favour, by restricting variolous inoculation and the exposure of patients labouring under the small-pox. The inoculated and those who have survived the horrors of the natural disease are often the boldest detractors of the efficacy of cow-pox, for if this afford perfect protection, then have they encountered much pain and danger to no purpose, and it is well known how reluctant we are to acknowledge that we have suffered and laboured in vain. The British government has made but one effort to diffuse the benefits of the cow-pox, by endowing an institution* in the metropolis for the gratuitous vaccination of the poor, and supplying lymph to applicants in all parts of the kingdom free of expense. It is often of so much value to obtain an immediate supply of genuine lymph, when the small-pox unexpectedly breaks out in any district or family, that it might be beneficial to have more than one centre whence it could be demanded. It is possible that the legislature, on considering the subject, might find it advisable to make some provisions for vaccinating gratuitously those paupers who are desirous of it, as I have known instances of their being refused on making

Legislative
measures to
promote vac-
cination.

* *The National Vaccine Establishment.* By making application to this Institution in an enclosure addressed to the Secretary of State for the Home-department, lymph can be obtained free of all expense.

application to a surgeon, because they did not belong to the parish they resided in, and whilst means were taking to procure an order from the overseer, the small-pox has advanced and made victims of those who were sensible of all its horrors and willing to avoid them. The poor should be vaccinated at the expense of the parish in which they reside, and not of that to which they belong. Restrictions upon those attacked with the small-pox would obviate many of these inconveniences, by making the danger less immediate and giving time for the general adoption of vaccination; and it would be very consistent with the most liberal government, to direct magistrates, guardians of the poor, and parish-overseers, how they might best proceed to proclaim the appearance of small-pox in any district, with the laws respecting it, and the preparatory steps to a general vaccination.

Promotion of
vaccination
by individuals,
charitable
associations
and guardians
of the poor.

In proportion as a government is indisposed, from whatever cause, to take measures for promoting this most powerful means of preventing disease and misery, there is a greater necessity for the exertion of educated individuals, corporate bodies, local authorities and charitable associations. It is upon these, and the co-operation of the medical profession, that it becomes us chiefly to rely for insuring the extensive

practice of vaccination, and nothing needs to be despaired of, where there is energy equal to the importance of the object to be accomplished*.

Charitable associations, which are the boast and ornament of England, cannot be formed for any better purpose than the diffusing of cow-pox, as we have no other means in our power that can be effectually applied at so little expense, to the preventing of misery and death. In suggesting the means suited to Norwich in this respect, I shall be representing what exists in many large towns and is applicable to every populous district in the kingdom.

To lessen the fatal effects of the small-pox on any future occasion, an establishment should be formed, supported by annual contributions, the amount of which should at least be sufficient to procure a house where all applicants may be vaccinated on certain days in the week, and to answer the expenses of a general census in order to ascertain the names of those who require to be vaccinated. This census ought to be taken in the spring of every year, and each of the medical men who choose to be connected with this institution and to offer their services, should engage to visit and to vaccinate all those desiring

Means adapt-
ed to pro-
mote vaccina-
tion in Nor-
wich.

* See Appendix, No. 2. for what occurred at Thetford in Norfolk, in 1819.

An institution
for promoting
vaccination.

it at their own houses. It should be the object of this society to get the earliest information of the introduction of the small-pox, and to adopt the measures best calculated to retard its immediate progress. The views of this institution would find a great assistance from the half-crown donation now so liberally offered by the court of Guardians to every vaccinated child resident in Norwich, to whatever parish it belongs; and it is to be hoped this body might be induced to add one more mark of its desire to protect the poor as much as possible from small-pox, by providing a building for insulating those who fall down with the disease. The heads of families would do well to further these humane views by refusing to take into their houses servants liable to small-pox, a measure they are as much interested and justified in pursuing, as they would be in refusing to hire a servant whom they knew to be strongly disposed to a disease that must interrupt them from performing their daily occupations. It should be a standing regulation of all charity schools, and of all extensive institutions for the reception of children, that none be admitted but those who have had small-pox or cow-pox; this law existed and was for some time acted upon in a large establishment of the kind in Norwich, but the long absence of the small-pox brought the regulation into neg-

lect, and the consequence was, that many died of that disease, and a portion of the benefits to be derived from the institution was lost to the public. The guardians of the poor should look to the safety of all those admitted into workhouses, and it is probable they would not exceed their duty by inquiring of every pauper who applies for relief on account of an additional number of children, whether these have been vaccinated, and by giving them a liberal or a rigid allowance accordingly, because if these children subsequently take the small-pox, the parish will be burthened with an expence which might and ought to have been avoided. All these subjects are deserving of some attention, if it be a part of the duty of the educated and humane to obviate as well as relieve the distresses of their fellow creatures, and to save human life.

*Advice to
masters of fa-
milies and
guardians of
the poor.*

I have already shewn that variolous inoculation was rather permitted than encouraged, and that laws were rarely made respecting it except to prohibit or restrict the practice of it. How different has been the progress of vaccination ! has it not been every where received as the greatest blessing that human ingenuity ever practised or discovered ? have not the deaths from small-pox been diminished in a direct proportion to the extension of vaccination ? has not the mortality been in some countries reduced

Reception
and practice
of vaccination
in foreign
countries.

from a thousand to an unit, and in others the disease banished altogether? a reply to all these questions is most readily found in the authentic records of many of the countries of Europe*, and a comprehensive view of the extent to which vaccination has been practised, and of the laws and regulations which have been made to support it, would comprise a mass of evidence greater than was ever, in the same space of time, elicited by any human discovery.

The great extent to which vaccination may be carried, in a country where direct and arbitrary laws can be enacted to promote it, depends upon the mildness of the cow-pox, its not being contagious, and the small expense at which its full benefits can be diffused amongst the poor. Despotic governments soon became acquainted with this recommendation of the practice, and took full advantage of it.

Great extent
of vaccination
in Russia.

In Russia, previous to the discovery of vaccination, it was estimated that a seventh part of the population perished by the small-pox. The new practice was therefore eagerly introduced into that country at an early period, and its efficacy being ascertained, strenuous means

* See Appendix, No. 3. for an abstract of the "Report of Vaccinations practised in France in 1816."

were adopted to make it general. The effects were most favourable to human existence, the official returns of the medical men to the government from 1804 to 1812 proving that *twelve hundred thousand* individuals were vaccinated during that period.

Vaccination was introduced into Denmark in 1800, and the number of individuals vaccinated to the end of 1817 was 343,167*. From information with which I have been favoured by Doctor Gordon, and which he obtained from an extensive statistical work just published in that kingdom, it appears that since 1808 the small-pox no longer exists there and is totally unknown. If the means employed on this occasion can be justified, it can only be by the desirable end which has thus been accomplished. In a *circular* addressed in July 1816 to all magistrates and bishops, it was ordered that all should be vaccinated, without a compliance with which injunction no individual could be received at confirmation, admitted into any school or public institution, or bound apprentice to any trade. Priests were also forbidden to marry those who had not had either the

Laws to pro-
mote vaccina-
tion in
Denmark.

* The two dutchies of Holstein and Sleswick are not included: they contained 600,000 inhabitants, and the number vaccinated up to 1814 was 75,110. The same laws are applied to these dutchies as to the rest of Denmark.

small-pox or the cow-pox. Amongst the regulations respecting precautions to be taken on the small-pox breaking out in any district, the proprietor of the house in which it appears is enjoined to give immediate notice of it to the curate, magistrate or director of police. An annual report is published of the results of vaccination, which is judged to have been adequate by a comparison with the number of births and burials. Some estimate may be formed of the lives thus preserved by vaccination, from 5,500 having died of the small-pox in *Copenhagen alone* during the twelve years preceding the introduction of the practice, whereas the total number of deaths from this disease in the whole of the Danish dominions from 1802 to 1818 was only *one hundred and fifty eight!*

Respecting the reception and propagation of vaccination in the Prussian dominions, I have received authentic and extensive information from Dr. Bremer, the zealous and indefatigable conductor of an institution in Berlin, which has secured the life-protecting influence of the vaccine virus to nearly 30,000 individuals, who were visited at their own houses during the progress of the disease. The first notices of vaccination were in 1801, and in 1803 variolous inoculation was prohibited, except small-pox

Reception
and propaga-
tion of vacci-
nation in the
Prussian do-
minions.

was epidemic, or in the same house, or the inoculated were completely insulated ; and in these cases the operation must take place under the direction of a medical man. In three years 80,000 were vaccinated. Laws were subsequently issued to make medical men give notice of small-pox appearing, and to insulate those labouring under it, and in 1810 it was estimated that 600,000 individuals in the Prussian dominions had received protection by the cow-pox. In 1816 an edict was issued from Coblenz imposing additional regulations respecting small-pox and its powerful preventive. None were allowed to approach the house in which the small-pox existed, no variolous patients to expose themselves abroad until a medical man had certified that it might be done without injury to the public, and if any chanced to die of the disease, they were to be buried within twenty-four hours, *silently and unattended*, without the tolling of a bell. All the costs were to be defrayed by the parent or master of a family through whose fault or negligence the mortiferous disease had been introduced. It being so important to vaccinate from arm to arm, the expenses of those children and parents whose time had been taken up for that purpose were directed to be defrayed by the state.

Before the introduction of vaccination, 40,000 were stated to die annually of the small-pox in the Prussian dominions. The present population has been increased by an accession of territory and amounts to 10,600,000 ; and out of the total number of deaths in 1817, amounting to 306,728, only 2940 were occasioned by the small-pox. The cause of vaccination has strengthened more and more in this kingdom, and cannot fail, under the laws and regulations which exist, to exterminate the small-pox. The latest accounts with which Dr. Bremer has favoured me nearly confirm this object. In Berlin, containing 188,000 inhabitants, the total mortality in 1819 was 6,359, and *twenty-five* deaths only were occasioned by the small-pox. The 14th of May is an annual festival to commemorate the day on which JENNER made his first experiment about the cow-pox ; and at the meeting of medical men in Berlin, held for this laudable purpose in 1819, the official returns made by vaccinators from the different departments gave an account of 307,596 persons vaccinated in 1817 in the Prussian dominions, which did not include the total number who had submitted to the process, as from several of the departments the returns for that year were not yet arrived. This number, far exceeding the births that can have taken place during that time, shews a great ad-

vancement towards making the practice universal, and when this is once accomplished, the list of annual vaccinations, compared with the births and burials, will precisely indicate the state of the country in regard to the liability of its inhabitants to take the small-pox*.

A voluminous work has been recently published respecting vaccination in the principality of Anspach† in Bavaria, proclaiming to the world "the great event of the complete extermination of the small-pox." This district seems to have been prepared to set a value upon the practice by having formerly suffered so much from the small-pox: above 500 were on an average destroyed by it annually during 1797—8—9, and no less than 1609 perished from it in 1800, amongst a population of 266,406 individuals. The vaccine ichor was first employed

Extent and effects of vaccination in the principality of Anspach.

* In 1817, the department of Breslau contained 510,617 inhabitants. In 1818 the number vaccinated was 18,178, of whom 17,639 had regular cow-pox, and 539 took no effect; 879 of these were vaccinated at one institution in the capital of the department, 46 taking no effect, and 253 ceasing to attend without the disease being watched through its progress. It appears that, during the same year, the small-pox was introduced into this province in 9 different places, but from the extensive vaccination, and insulating those who fell down with the disease, only 28 in all took it, and 6 of these died. *Resultate der Schutz-pocken-impfung in Breslauischen Regierungs' Department von Jahre 1818, von Dr. Fries, &c.*

† *Die Schutz-pocken-impfung in ihrer endlichen Entscheidung, als angelegenheit des Staats, der Familien und des Einzelnen, von G. F. Krauss, &c. Nürnberg, 1820.*

in this province in 1801, and regulations were soon made, limiting the practice to persons regularly educated, appointing a certain number to each district and rewarding those who shewed most zeal in the “good cause.” The deaths from the small-pox were for two or three years $\frac{1}{14}$ of the whole mortality; in the fourth year they amounted only to $\frac{1}{16}$; and in 1805, when Dr. Kruass took the appointment of director of vaccination, 155 died of the small-pox. In April 1807, an order was issued to prevent all persons labouring under small-pox from entering the territory, and to require all parents whose children should fall down with the disease to give information (under a fixed penalty and all the costs that might attend the suppression of the disease) to the clergyman of the parish, on which the police were to take care to allow no one to have intercourse with the contaminated house. It was likewise enacted that none but medical men, authorized by education and a certificate, should be allowed to vaccinate, and each was to keep a register according to a printed form, and if he neglected to do so, to lose the privilege of vaccinating; these registers were returned to the government every three months. The result of such regulations was that 37,880 persons, or $\frac{1}{15}$ of the whole population, were vaccinated before the end of the year without a single fine.

being imposed, and thousands were thus saved from deformity, disease and death. The success of these measures seems to have induced additional regulations, with the hope of wholly banishing the small-pox, for it was soon enacted by Maximilian Joseph, King of Bavaria, that from July 1808, all persons above a certain age who continued to neglect to be vaccinated should be fined by an increasing penalty every year; so long as they refused to take the means for their own protection. None were exempt from this fine, except they had previously had small-pox or cow-pox, had been thrice vaccinated without effect, were beneath the prescribed age, or possessed a certificate from an authorized vaccinator stating that ill-health or some disease in the system made it proper to defer the operation. Every house in which a variolous patient resided was to be placed under *quarantine* for one month, as if the plague were within its walls, and all intercourse as far as possible prohibited. Inoculation was forbidden, and a penalty enforced against all those who performed it or submitted to it. These regulations were accompanied by most judicious advice to medical men, reminding them how necessary it would be on their part to give great care and attention, in order to effect the desirable object of exterminating the small-pox from this portion of the

Bavarian dominions. From the time that these energetic measures were undertaken, such progress was made that 162,414 individuals had been vaccinated up to the year 1818*, and only

* The returns of the vaccinated include private as well as public patients, and I have compressed into a small compass a table of the number which submitted to it during twelve years. From political events the amount of the inhabitants varied during that time, the limits as well as the name of the principality being thrice changed. Upon an average the expense of vaccinating has been less than *threepence* per head, and after making ample allowance for instances in which the operation took no effect, and where it was paid for by private individuals, we may calculate that a life was saved to the state for *half-a-crown*—an economical way of recruiting an army and reviving a flagging population.

A table of the Vaccinated in Anspach during 12 years.

Popula- tion.	Date of the vacina- ted.	Number vaccina- ted.	Vaccinated success- fully.	Vaccinated ineffectu- ally.	Cases of small- pox.	Deaths by small- pox.	Expenses. £. s. d.
210,000	1807	37,880	500	50	100 0 0
	1808	5,979	5,025	954	8	1	116 11 9
	1809	4,584	3,822	762	11	4	70 12 9
	1810	7,209	6,198	1,011	1	0	93 0 8
372,000	1811	10,762	9,514	1,248	0	0	146 12 3
	1812	11,598	10,461	1,137	0	0	146 18 1
	1813	10,085	9,641	444	1	0	133 18 7
	1814	9,362	8,923	439	0	0	126 18 6
	1815	9,099	8,710	389	2	0	118 5 6
	1816	10,159	9,881	278	0	0	130 2 1
497,000	1817	12,337	12,019	318	0	0	160 12 3
	1818	12,701	12,425	276	0	0	166 9 7
Total.		141755	96,619	7,256	523	55	1510 2 0

The great proportion of failures is accounted for by many being at first vaccinated who might formerly have had the small-pox mildly, by all those who had resisted it for years preceding the introduction of vaccination presenting themselves, and by the same individual

five deaths happened from the casual introduction of the small-pox during eleven years, although this disease prevailed epidemically, as I have already observed, in the immediately adjoining kingdom of Wirtemburg.

This petty kingdom, placed in the vicinity of great and powerful governments, and estimating its strength by its population and the number of military which it is able to muster, acted without policy in neglecting vaccination. The destruction occasioned by the small-pox, during the four years I have alluded to, awakened the king of Wirtemburg to his own and his people's interest, and strong laws were enacted in 1818, of which the following is the substance: "Every child must be vaccinated before it has completed its third year, under a penalty to be annually levied on the parents, so long as the

Laws respecting vaccination in the kingdom of Wirtemburg.

being sometimes registered as often as the operation was repeated. As the practice has extended the proportion of failures has diminished, and in the last year of the table it is only 1 in 46: but of the 276 ineffectually vaccinated in that year, three-fourths were to be submitted to a future trial. Since the laws were put in force, the fines for neglecting vaccination are stated to have been actually levied only upon 12 persons, and 3 are noticed as having refused through obstinacy; but in many instances the fines were about to be imposed, when it was found that the error had originated in the vaccinator, whose register was incorrect. The public vaccinating begins with May and ends with October. In the census taken for the year ending in 1818, the number liable to small-pox was 16,952, of whom 12,701 only were afterwards vaccinated during that year, 3522 being under age, and 729 exempt on account of disease.

omission continues; and if the operation fail to take effect, it must be repeated every three months until a third trial, when it shall be regarded as insusceptible of the cow-pox. No person can be received into any school, college, or charitable institution, be bound apprentice to any trade or hold any public office, who has not been vaccinated. When small-pox appears all those liable to take it must be vaccinated without unnecessary delay, except infants under three months of age; and the operation failing, it must be repeated every *eight days* until a third trial, under a penalty. The superintending of vaccination is limited to medical men, each of whom takes charge of the poor in a certain district, and a fine is levied upon all persons who undertake to vaccinate without being properly qualified. A register is to be kept, in which the name of every child must be enrolled the day after its birth, and if it chance to die before it is old enough to be vaccinated, notice must be given of the event. Provision is made for obtaining fresh vaccine ichor annually from the cow, and for vaccinating directly from arm to arm, parents and children being recompensed for the time thus taken up for the accommodation of others. Variolous inoculation is prohibited when small-pox is not present, and when this disease pre-

vails, the practice can only be done with impunity by a medical man, under such precautions as prevent the disease from spreading, and the expense of seclusion of all variolous patients, whether the disease has been taken by contagion or inoculation, is to be borne by the parents, unless the individual had previously gone through the cow-pox or been thrice vaccinated without effect*".

Such are a few of the effects that have been lately produced in the legislature and the people of several countries by the discovery of vaccination, and documents more authentic and convincing can scarcely be required to shew its practical and real efficacy. Is it possible to estimate lightly a measure that possesses the power of exterminating a pestilence which has been computed annually to sweep from the face of the earth 800,000 human beings? England is but a spot, its inhabitants a handful of human beings, in comparison of the extent of territory in the world to which vaccination has spread and the number of persons who have felt and acknowledged its benefits. The precious germ first sprung and blossomed in England; its seeds were quickly wafted to far distant

Concluding
remarks.

* Gesetz, die allgemeine Einführung der Schutz-pocken-impfung betreffend, zu Stuttgart, den 25 Juni 1818.

regions, where they took root, and grew, and were nurtured with the greatest care as valuable exotics ; whilst in the country where the life-saving plant may be regarded as indigenous, it too often droops and fades for the want of cultivation. Yet even in England the credit of vaccination ought not to be a matter of indifference ; it is as dear to parents as the safety of their children, as important to thousands of individuals as their lives ; and were it suddenly to be discovered that no protection is afforded by it against the small-pox, it would affect the the prosperity of some of those institutions which are a valuable prop and support to society.

I advocate vaccination, because I believe it to be the most powerful means of preventing the misery attendant on disease and of saving human life, which Providence has vouchsafed to put into the hands of man ; my time has been given up to the gratuitous practice of it, because I can thus do more good amongst the poor than by prescribing pills and potions ; and I regard every drop of the vaccine ichor as the most active material that can be admitted into the list of our prophylactic remedies. I am therefore grateful to the philosopher, who has taught us to wield this weapon of defence in overcoming the worst of human maladies.

The more we reflect upon the professional career of JENNER, the more must he excite our admiration, for the scientific investigations by which he established his discovery—the nobleness with which he gave it fully to the public—the temper and ability with which he defended it against opponents often not of the best character. May his life be uniformly happy, and his name—immortal !

APPENDICES.

APPENDIX, No. I.

— *Containing a translation of Dr. Heim's paper upon the diagnosis between Variola and Varicella.*

A Physician having reported that he saw small-pox three years after vaccination, which declined suddenly and scabbed on the 6th day*, Dr. Heim of Berlin affirmed it to have been varicella; and this dispute seems to have produced the paper in question. Dr. Heim's observations on the diagnosis between these two diseases were published in Horn's Archiv † for 1809; but they have lately been diffused afresh in a posthumous work‡ of the celebrated Professor Richter of Goettingen, from which source I have made the following translation.

“ This disease is chiefly of importance in diagnosis, being “ in fact mistaken very easily for the small-pox. From a “ proper diagnosis between these two diseases, we have to “ determine whether an individual has already had the small- “ pox, whether this disease may occur twice, and whether “ it be possible to produce it in a person who has gone re- “ gularly through the cow-pox. There is no doubt, that “ when inoculation for the small-pox was much practised, “ the surgeon, in many cases, used matter taken from a sub- “ ject who had only chicken-pox, and thus produced a spurious

Importance
of the diagno-
sis.

* Hufeland's Journal der Practischen Heilkunde, B. 28. S. 3.

† Archiv fur Medizinische Erfahrung, B. 5. H. 2.

‡ Die Specielle Therapie nach den hinterlassenen Papieren des verstorbenen A. G. Richter, B. 2. p. 342—1817.

"disease, which afforded no protection against the small-pox. Confounding these two diseases may moreover become the cause of unnecessary restrictions being adopted by the police through fear of a variolous epidemic, or of the neglect of such measures as would prevent it."

Three sorts
of varicella.

"Varicella is met with in the three following forms:
"1. *Waterpox*. The pocks contain a white transparent fluid, "but no true pus; they are of different sizes, and have a "slight indentation in the middle. If the lymph should "assume the purulent colour, the pocks will look exactly as "if they were variolous. 2. *Hornpock*. These appear as "pointed elevations, without any indentation, are hard or "even warty, and do not contain lymph. 3. *Swine-pox*. "These are mostly of an oblong shape, sometimes quite "round. They become much larger than variolous pustules, "have occasionally a red circle at their basis, suppurate, "and are fully distended with their contents, leaving irri-table ulcers and cicatrices."

"At the bed-side of the patient it will, however, be always "found very difficult to distinguish these different forms of "varicella, as the disease is met with in all the intermediate "stages, and as the three forms of the disease may even be "present in the same individual. Therefore some physicians "have established many other species of varicella; but it is "not yet determined whether there be any essential difference "in these various appearances which it assumes. It may "occur twice, or even thrice, to the same person; when this "happens, it is, however, probable that it assumes a different "form each time."

"In order to understand this disease, and to distinguish it "from small-pox, we must observe its appearances throughout "the whole of its progress. The fever which precedes "the eruption will be generally very mild, sometimes al-together wanting, often accompanied by catarrhal symptoms.

"On the second day of the fever, the pocks make their appearance in the form of small red *papulae*, which come forward rapidly, and assume one of the forms already described, filling with lymph, but never with true pus, the suppurative or secondary fever being always wanting, and the pocks drying up on the fourth day after their appearance."

Precursory
symptoms
and coming
out of the
pocks.

"This is the way in which this disorder shews itself most frequently, and is so insignificant, that it hardly deserves to be called a disease; the diagnosis between it and variola being so easy, that the most illiterate can hardly mistake it. But sometimes the fever commences with formidable symptoms, such as—great thirst—redness of the eyes—swelling of the countenance—retching—vomiting—delirium—
Extreme cases of variella.
convulsions—and continues to be severe for some days after the breaking out of the eruption. The pocks are, in this case, very numerous, not even sparing the internal surfaces, the throat, the mouth, the eyes, &c. and they form elevations exactly similar, in the beginning, to those of small-pox: the pustules become well filled with a white pearl-coloured matter, which one might readily pronounce to be true pus; the maturation of the pocks continues to the 6th, or even to the 12th day, which is even longer than in small-pox: the incrustation of the pocks is equally slow, and the scabs are longer before they fall off. Such cases are most easily mistaken for small-pox, and to find out the certain signs by which they may be distinguished, is one of the most important modern improvements in diagnosis. Such signs appear, in a few words, to be the following:
1. Varicella is said to be attended by a peculiar smell, not to be described by words, yet differing essentially from that of small-pox. 2. The varicellous is much more contagious than the variolous disease. All the members of the same family, not excepting even adults, will be attacked

Comparative signs of the two diseases.

" with the former; which does not so commonly happen with
" the latter. 3. The varicellous eruption shews itself upon
" all parts of the body nearly at the same time; the variolous
" is observed first in the face, and successively upon the body
" and the lower extremities. 4. In variola, no fresh eruption
" breaks out after the third day, whilst in varicella, fresh
" pocks will appear after that time. 5. The eruption in vari-
" cella itches greatly, and the separate *papulae* have a dark
" red colour. The variolous pocks inflame more in the inter-
" val between their first appearance, and their arriving at
" their height, children scratch themselves before the period
" of scabbing, and the colour of the eruption is a light red.
" 6. In varicella most of the eruption remains very small, not
" becoming elevated and distended, or at most only contain-
" ing a watery clear fluid. In obscure cases, the pocks are
" always fullest on the face, less full on other parts of the
" body, and least upon the extremities. In small-pox all
" the pustules become fully distended with true pus, even
" those upon the extremities. 7. The secondary fever is en-
" tirely wanting in varicella, whatever be the number of pocks
" that are filled with lymph. 8. Whilst the eruption is
" coming out, the countenance is swollen in varicella, but
" not in variola. When the eruption is fully out, this swelling
" of the countenance subsides in the former disease, at the
" very period when it begins to take place in the latter.
" 9. A complete varicellous pock is soft and inelastic to the
" touch; a variolous one firm and elastic. A varicellous
" pock has a hemispherical figure, like one half of a split pea
" placed upon the skin, forming nearly a right angle with the
" skin; a variolous pock is oval and forms rather an acute
" angle with the surrounding skin. If an opening be made
" in a varicellous pock, the contained fluid flows out very
" slowly, or not at all if the opening be very small, and the
" pock never fills itself again; in variola, on the contrary,

" the matter will escape quickly through a small opening, and
 " the pock will become distended afresh. The varicellous
 " pock never bursts of itself; the variolous often does, and
 " always contains more fluid. The skin at the base of the
 " varicellous pock is never elevated; whereas the contrary
 " happens in variola, and this elevation of the skin often
 " remains a long while after the scab is fallen off. The
 " fluid of the variolous pock is thin and milky, and not thick,
 " purulent and viscous, as in variola. The variolous scabs
 " are thicker and of an oval shape, the varicellous are thinner
 " and more round. The red spots left upon the skin in vari-
 " cella disappear sooner than those left by variola. In one
 " of the diseases very few scars are left behind, even when the
 " pocks are numerous; in the other a great many scars remain".

*Period of
scabbing and
blotches on
the skin.*

" There is no doubt that we can distinguish the scars left by
 " chicken-pox from those left by small-pox, and thus be enabled
 " to tell, after a number of years, whether a person has had
 " one or the other, which is of great importance in judging of
 " the protecting power of cow-pox. This however depends up-
 " on the scars being complete and distinct, which we can only
 " expect to be the case, when the pustules have gone through
 " their proper course, in which they may be interrupted by
 " being bruised or scratched, and probably also by a scrofu-
 " lous or venereal state of the system. So likewise the
 " pustules of chicken-pox may degenerate into an ulcer,
 " and this is the case when fluid is formed in them after
 " the 12th day, and no regular scab is formed. The vari-
 " cellous scars, under these circumstances, lose more or less
 " of the peculiarity which distinguishes them from vario-
 " lous scars. The diagnostic signs are as follows:

*Diagnostic
signs from
the scars.*

" 1. The basis of the scars from chicken-pox is whiter than
 " the skin of the rest of the body, and smooth as the shell of
 " an egg; that of variola is not at all whiter than the skin,
 " and is uneven as the surface of a lemon. Besides, the

“former shows no points or indentations, which are not wanting “in the scars from small-pox, in which we find two or three “dark points, and always more, the larger the scar. In the “varicellous scar we never find hairs in the hairy parts, as “the eyebrows, scalp, chin ; the reverse is the case in the “small-pox, two or three hairs being often found upon the “surface of one scar.—2. The varicellous scar is round-“ed and smooth in the circumference, possesses at its “border the colour of the surrounding skin, and forms at the “base a hardly perceptible depression, so as even to assume “a convex appearance. Some old scars in adults are wrinkled “at the circumference, and even at the basis; but if they are “stretched the wrinkles disappear. The circumference of “the variolous scar, on the contrary, is always more or less “notched, is not different from the common colour of the skin, “and, however strongly stretched and extended, never be-“comes perfectly even and smooth, either at its basis or its “circumference. When stretched, it looks as if fine lines “were drawn across it.—3. The shape of the varicel-“lous scars is generally round, sometimes oval, and very “seldom irregular. When they have angles, it is when two “are joined together, from two pocks which were approxima-“ted to each other, or which ran into one another. The “shape of the variolous scar is seldom round and oval, often “notched and forming all sorts of angles.—4. The depth of “the varicellous scars varies much, partly from their age “and partly from the situation which they occupy. In “the neck and face, particularly on the forehead, they “are deepest; much less deep upon the extremities, back, “and abdomen. In very old scars, all depth is lost, so “that they are exactly level with the surrounding skin, or “even become elevated a little above it, particularly on the “back and abdomen ; but they remain unaltered as to their “colour. In variolous scars the depth always diminishes by

" time, and often entirely disappears without the least trace
" of them being left behind.—5. The varicellous pocks
" never leave many scars, often not above twenty, sometimes
" only one or two, and these happen most commonly on the
" face, above or on the nose, on the forehead, &c. More rarely
" they are found on the abdomen, back, or extremities, but
" always in greater number. The variolous pocks often leave
" many, even innumerable scars, mostly upon the face and
" hands, those upon the abdomen and back entirely disappear-
" ing with time.—6. The scars from accidental injury to the
" cutis, as from small ulcers, pemphigus, erysipelas, zona, the
" removal of warts or moles from the skin with caustic, from
" the bite of leeches, the use of the tartarized antimonial oint-
" ment, all of which may sometimes possess a resemblance
" to the scars left by pocks, are distinguished from them by
" possessing a hardness to the touch, which is never the
" case in the scars left by varicellous pocks, these being
" always very soft to the feeling."

APPENDIX, No. II.

Containing the result of a Correspondence with Practitioners in the County of Norfolk, and the adjoining parts of the County of Suffolk.

Origin of this correspondence. NORWICH being the central and principal town of a large district, I was induced, towards the conclusion of the year 1810, to address a circular letter to most of the practitioners in Norfolk and the adjoining parts of Suffolk, in the hope of gaining further information upon the subjects which had at that time so much engaged my attention. The success of this undertaking has convinced me that I was not deceived in my expectation, nearly one hundred replies having been forwarded to me, communicated (with a solitary exception) in the most obliging and polite manner. The greatest gratification I have experienced has arisen from men of *all opinions* and *almost all* practices having candidly related to me the arguments or facts by which their conduct has been determined. This can only have resulted, I conceive, from their believing that the object of my inquiries was to elicit a great mass of valuable evidence upon an important question, and not merely to ascertain, much less to expose, the practice of any individual. In condensing and generalising the materials which this extensive correspondence has afforded me, I shall no more think of criticising any man's opinion, than I should through fear have withheld my own in the pages which the reader has probably already looked over; and I can only add that I should estimate my labours at a much lower price, had they obtained me only the observations of the *friends* and *warm supporters* of vaccination.

The twelve queries contained in my circular letter referred to three heads— 1. the practice of vaccination— 2. the recent prevalence of small-pox— 3. the effect which the contagion produced upon those who previously had the cow-pox. In this order I shall therefore notice the result of my inquiries, introducing such additional observations as I have been favoured with.

From 93 surgical practitioners I received specific answers to the queries I proposed. Two of these, (one of whom was a practitioner regularly educated in the old school,) informed me that they had never at any time vaccinated any individual; all the rest had practised vaccination to a greater or less extent, and as some of them were surgeons who have been engaged extensively amongst the poor ever since Jenner's discovery, the number reported to have been vaccinated was very considerable. Taking the lowest amount offered to me by each individual, I find that 120,000 have been vaccinated by 91 surgeons, which I have no doubt is considerably below the number vaccinated in the districts to which these reports refer, because 26 surgeons, calculating from registers kept, or the amount of money received for parishes, state 13,313 to have been vaccinated by them in the year 1819.

My inquiries respecting the method of vaccinating alluded only to the number of punctures made, and to this point 85 have replied; of these 2 make never more than one puncture, 20 who formerly made one or two now make more, 36 make two, 6 three, 17 never less than four, and 4 insert ichor a second time by way of testing. Various reasons are assigned for these different methods; one surgeon states that he always makes six punctures where a previous vaccination has failed, and another that he does the same in adults, who take the disease with more difficulty. But many enumerate the circumstances which have induced them not to adhere always

Substance of
the queries
contained in
a circular
letter.

Proportion of
surgeons who
vaccinate.

Method of
vaccinating.

to the same number, such as the age and state of health of the patient, the presence or absence of small-pox, the supply of ichor or the prejudices of friends. Instances are reported to me by several correspondents, of vaccination failing after repeated attempts, and small-pox being afterwards communicated by inoculation; or both these failing and the disease being subsequently taken by contagion; or the individual continuing permanently to resist small-pox and cow-pox. *Mr. Sharman* of *Diss* believed, that 5 in every 100 of the poor vaccinated cannot be pronounced secure, on account of injury or irregularity in the progress of the disease, the areola being imperfect, or the constitution not visibly affected, and on repeating the operation in all such cases he has been often disappointed. Numerous Surgeons mention their vaccinating the poor gratuitously, and most of them lament that a practice so beneficial to the community should not be universally admitted.

Extension of small-pox over the adjoining counties.

By the removal of paupers or servants labouring under the disease, and by the great number of people who weekly visit Norwich, (where the streets and public places presented the most hideous objects of the small-pox,) the epidemic of 1819 extended to most parts of Norfolk and the neighbouring counties, and was attended by the same disastrous and fatal effects which I have already described to have taken place under my own observation. So general has been the disease for 20 or 30 miles around Norwich, that 11 only of my correspondents have had occasion to state that they saw no case of it during 1819. This they have accounted for in different ways. In the districts superintended by three of these gentlemen, the small-pox had prevailed the year before; in two others it occurred two years ago; in a 6th four years ago. Two gentlemen refer the absence of small-pox for the last seven years to the extensive practice of vaccination, believing that there are few in their districts who have not submitted

Districts in which there was no small-pox.

to it. Another thinks the reason of his seeing no variolous patient in 1819 is attributable to his going round to all those parishes where he has influence once every year "armed with his vaccine points." *Mr. Manby of Rudham* having met with no case of small-pox for twelve years in eleven parishes which he attends, although it had been frequently prevalent in adjoining parishes, finds no other causes for this immunity than his "endeavours to overcome the prejudices against vaccination, adopting it wherever he could, and abstaining from variolous inoculation".

Of the 82 correspondents who had seen variolous patients in 1819, some rejoice at having met with only a case or two. *Mr. W. Crowfoot of Halesworth* observes: "small-pox has twice made its appearance here within 12 months, but from a timely removal of the infected to a house appropriated to those cases, at some little distance from the town, it made no progress amongst us." *Mr. Larke of Brooke* mentions that only 3 patients were affected by small-pox introduced into one of the parishes under his care, 55 in the same spot being vaccinated immediately and protected; and he attributes his having seen only 5 cases of the fatal disease in the course of the year, to his having been forward in vaccinating 10 other parishes. In *Thetford*, a borough containing about 2100 inhabitants, the small-pox was limited to a few persons by the most judicious means, the surgeons of that place (*Mr. Best, and Mr. Bailey,*) being assisted by the municipal authorities. An individual falling down with the small-pox in June, the latter surgeon gave information of it to the Mayor who immediately called a meeting of the inhabitants, and from the able way in which the measure was advocated, vaccination was determined on. The Parish-officers visited every house, made a list of all those liable to the contagion, and threatened to expose any individual who should refuse vaccination, or submit

Districts in
which the
small-pox at-
tacked only a
few individu-
als.

clandestinely to variolous inoculation. The list thus made was delivered to the two surgeons, and the bell-man was employed to announce the hour on the following morning at which all those requiring it might be vaccinated at the churches of their respective parishes. Notwithstanding the fears and prejudices which had been created against vaccination by the reported failures in Norwich, these prompt means were successful; about 200 were vaccinated, most of them in the course of two days, and were thus protected perfectly from small-pox, which extended only to 8 or 10 persons, all of whom survived*. This proceeding shews clearly, as Mr. Best remarks, what may be done for the cause of vaccination and the good of the public, where the heads of towns enter upon the subject in a proper manner.

Districts in
which the
small-pox
prevailed ex-
tensively.

In a great majority of instances the small-pox has been represented by my correspondents to have prevailed more extensively, and 28 of them mention having, in the course of the year of the epidemic, attended altogether 593 patients with the casual disease, of whom 97 died, 12 being the greatest number of deaths reported by any individual to have come under his own observation.

Besides these, 180 deaths are enumerated as having occurred in the districts where these surgeons reside, in persons whom they did not superintend during the disease. This affords an imperfect estimate of the mortality which the pestilence occasioned, the poor continually neglecting to obtain the benefit of medical attendance for their children suffering under this disease, and no register being kept by which the precise

* *Mr. Bailey* mentions that a child died, which had been inoculated by its parent, but, for the want of opportunity to apply for further information, I am unable to state whether it happened on this or a former occasion. "The event", he says, "tended to some considerable good, by preventing others from doing the same".

number of deaths could be ascertained in any district. At *Lynn*, the population of which town exceeds 10,000, the mortality was very great, notwithstanding the means employed to prevent it, and the very extensive prevalence of the disease three years before. I am possessed of the best materials that could be obtained for an account of the effects of the small-pox in this town, through the kindness of *Mr. Fulcher*, who prefaces his communication by saying "perhaps there is no place where vaccination has had more inveterate prejudices to overcome, and few at the present day where it has been less promoted or practised." The small-pox was introduced into this town early in the year 1819, but it did not spread with rapidity until the warm season. In June the mortality occasioned by it excited the attention of the more enlightened inhabitants, and the clergy directed that all burials from the small-pox should be specified in the register. From this period to the end of August, 40 were noted as having died of that disease, and the total amount of burials in the preceding months, indicated that at least 70 deaths were produced by the small-pox during the whole of the year. The fatal effects were diminished, by efforts being made, when the contagion was most rapidly spreading, to promote vaccination, which was practised in 1819 to a greater extent than at any former period. The Guardians of the poor offered the half-crown rewards to every one who produced a certificate of having gone perfectly through the cow-pox, and 179 claimed this gratuity out of 398, who were vaccinated satisfactorily at the public dispensary.—In the populous town of *Yarmouth*, containing considerably more than 15,000 inhabitants, the small-pox was very frequent in the same year, and three correspondents mentioned 16 deaths in their own practice, but I have not been able to get a more precise return of the mortality occasioned there. The disease was still raging and increasing at the end of the year.

Deaths from
the casual
small-pox.

Seventy-three correspondents have replied to my query as

Sources from
which the
small-pox
was introdu-
ced into dif-
ferent dis-
tricts.

Extent to
which vario-
lous inocula-
tion was
practised, and
effects pro-
duced by it.

to the source whence the contagion* was derived : 34 state it to have been brought into each of their districts from *Norwich*; 6, from *Yarmouth*; 3, from *Lynn*; and 14 from smaller towns : 7 are doubtful of its origin, and 9 affirm it to have been introduced into parishes where it did not before exist, by variolous inoculation. This injurious result of the practice of inoculation is depicted by many in the strongest and most feeling language. One surgeon states that, from the first person who casually fell down with the small-pox in his neighbourhood, 40 were immediately inoculated, spreading the disease in all directions ; another, that in 4 parishes out of 5, where he had attended variolous patients, the contagion was brought by an irregular practitioner, who went about inoculating ; a third, that a child went to an adjoining town to get inoculated, and became the centre whence the contagion spread throughout the parishes under his care ; a fourth states that, before the present year, he had repeatedly been able to prevent the spreading of the disease beyond the family in which it originated, but that a man of bad character and not at all acquainted with medical subjects, had, for a small gain, made it his business to extend the disease far and near, and he thinks, "whilst this is permitted, we shall seldom be free from small-pox". In addition to these, I may quote *Mr. Dix* of *Smallburgh*, who found the small-pox in nearly all of the 42 parishes which he superintends, and to many of them it was conveyed by inoculation.

It is impossible for me to estimate, from the information I have received, the number that has been inoculated, but I

* *Mr. Mines* of *Diss* mentions small-pox having been introduced into a family in his neighbourhood by linen sent twenty miles to be washed for a patient just recovering from the disease. *Mr. Sharman* says he has more than once traced the source of small-pox to infected clothes brought from London by old-clothes-dealers.

can produce documents to shew some of the effects of inoculation in giving rise to fatal disease in the individual who adopted it, as well as in extending the contagion to others who might otherwise have escaped.

Classing all practitioners together, without any reference to the character they maintain, or the education they have received, the proportion who have willingly performed variolous inoculation during the year 1819 will not be very considerable.

Of the 93 surgeons, who favoured me with their communications, 55 did not practise variolous inoculation in that year. Of these 55, 13 merely state that they did *not* inoculate; 2, that they were not requested to do it; and 40, that they refused to practise it upon any one who applied to them.

The remaining 38 surgeons practised inoculation under different circumstances; 2 inoculated and did not vaccinate any one; 8 recommended vaccination and inoculated all who requested it; 8 inoculated those who refused vaccination, because the small-pox was raging; 7 inoculated those who refused vaccination in houses where the small-pox already existed; 6 yielded to the urgent entreaties of private families who were mostly secluded during the disease; 5, after refusing many, inoculated whole parishes at the desire of the directors or overseers of the poor; and 2 inoculated where small-pox was in the same house, because vaccine ichor could not be immediately procured.

The practitioners who, from these various motives, practised variolous inoculation, report to me the deaths of *twenty-one* of their patients; one, who inoculated extensive parishes, states *three* persons to have died of the disease thus induced; a second laments that he lost *five*, and a third lost no less than *seven*. This great mortality occurred to those who, against their own judgment, were called upon to inoculate immediately great numbers of the poor. Three are mentioned by other surgeons to have perished from measles being

Deaths from
inoculated
small-pox.

conjoined with the disease produced by inoculation.

Medical men, however, inoculated comparatively few during the year of the epidemic. The greatest inoculators were the parents of poor children, farriers, blacksmiths, tailors, shoemakers and old women. All these descriptions of persons are represented as having practised the operation, some from affection and humanity, some from a spirit of opposition, many for gain and a few from worse motives. The mortality attending the practice under these circumstances, has of course been considerable; 55 deaths are reported by 14 surgeons to have been thus occasioned within their knowledge, and 5 other surgeons observe that they have known *several* who fell a sacrifice to a practice conducted by such improper hands. One surgeon states that he was, in the course of the year, called to many patients inoculated by some of the description of persons alluded to, and that *five* whom he attended *died*. In *Yarmouth*, where the medical men were unanimous in discouraging inoculation, *Mr. Preston* informs me that a woman was summoned before the Mayor for inoculating, and dismissed with a reprimand. In the neighbourhood of *Diss*, an uneducated man went from parish to parish inoculating, and *Mr. Burt* informs me, that no prosecution was carried on against this man, because the Magistrates, on being applied to, said they could not prevent him.

Small-pox
occurring
twice to the
same individual.

In the queries which I circulated, I made no allusion to small-pox occurring a second time to the same individual. This omission has been supplied by many of my correspondents, who have stated to me their experience in this respect; and the value of this information is enhanced by its having been given without solicitation.

Ten correspondents have described cases, under their own care, of small-pox in those who formerly had the casual or inoculated disease. Some of these happened before, others

during the year 1819. Amongst the former I find;—1.

Mr. Earle of *Cromer* states, that, two years ago, a woman who had been inoculated 20 years before, fell down with the small-pox, (after visiting a relation at some distance, labouring under the disease,) and thus introduced the contagion into his neighbourhood, which was extended, in spite of his anxiety to prevent it, by an old woman taking some matter from this variolous patient, and inoculating many others. This woman had a child at the breast, vaccinated a few weeks before, and it remained unaffected by the contagion from which its mother was suffering severely. Another surgeon afterwards inoculated 30 persons whom *he* had refused. “Thus the whole parish”, *Mr. Earle* observes, “was completely infected, but not a single patient of mine, who had previously been vaccinated, suffered from the prevailing contagion, although great pains were taken to make them do so.” Besides the inoculated person, who thus introduced the contagion by a second attack of the disease, he represents that a young man, whose friends asserted that he had been formerly inoculated, and whom *Mr. Earle*, on inquiry, believed to have had the disease in a satisfactory manner, took the small-pox and died of it. He also adds the particular account of a case of small-pox after natural small-pox, which he formerly met with. A girl was supposed to have had the small-pox when a child, two of the family having at that time died of it. Several scars were left, which *Mr. Earle* examined when first called to the girl, before any *eruption* appeared; and *this*, on coming out a day or two after, proved to be small-pox: she had a considerable crop of pustules, which advanced regularly, accompanied by a secondary fever, and although in much danger for several days, she finally recovered. She had taken the disease after being exposed to a person labouring under small-pox and others, inoculated from her by way of experiment, had the regular variolous eruption.—2. *Mr. Fulcher* of *Lynn* states

Secondary
small-pox at
former peri-
ods in Nor-
folk.

that, of small-pox occurring a second time to the same individual he has seen one example—3. *Mr. Sharpe* of *North Walsham* says he has known indisputable proofs of secondary small-pox in the natural way, and quotes a particular instance—4. *Mr. Faycman* of *Swaffham* speaks of a patient, who had been inoculated twelve years before, and who died of the small-pox two years ago, during his attendance upon him—5. *Mr. Haward* of *Halesworth* states that he has attended two cases of natural small-pox, in persons who had the disease some years before by inoculation. To what extent information of this sort might have been accumulated, had I circulated a query upon this subject, and appealed to the experience of practitioners for an unlimited number of years, it is not needful to determine, because the few facts which I have related prove as much as it is necessary to be acquainted with.

Secondary
small-pox re-
ported to have
occurred in
1819.

The cases reported to me of secondary small-pox during 1819 are not less numerous. 1. *Mr. Merriman* relates one case of the kind in the parish of *Stallum* where he resides. 2. *Mr. Bayes*, of *Lynn*, attended a case of confluent small-pox in a young lady, whose parents informed him that she had suffered from an eruptive disease seven years before, which was pronounced by two surgeons to be small-pox. 3. *Mr. Raven* of *Lytcham* met with one case of small-pox in a patient twenty-five years of age, which ended fatally on the 16th day; he had been inoculated when two years old. *Mr. Wallace*, who resides in the same place, assents, in a separate communication, to this fact respecting the occurrence of fatal small-pox, after inoculation which there was reason to believe authentic. 4. The term *modified* is applied by *Mr. Crowfoot* of *Beccles* to four cases of mild secondary small-pox, the particulars of one of which he has given at length. “The coachman of a gentleman, 26 years old, had small-pox *severely* when a child. After smart fever, with a tendency to delirium, shiverings, pain in the back and limbs,

Modified
small pox af-
ter small-pox.

uneasiness on pressure about the scrofulous cordis, and constant vomiting, a papular eruption appeared. On the second day, the pimples had small vesicles at their apices, and began to have a rose-coloured inflammation around their bases. On the fourth day they became pustular, and the day following began to turn brown. In a few days more, they fell off, leaving, in many instances, scars behind them. Very profuse sweating attended the early part of the eruption. A boy in the same house, who had never been inoculated, took the contagion, and after the usual period had regular small-pox."

In relating, upon the evidence of some of the most respectable medical men in the county of Norfolk, *three* fatal cases of secondary small-pox, and several others of a severe kind, after inoculation, a majority of which occurred in 1819, I entreat the friends and enemies of vaccination to hold them all in remembrance. Before proceeding to consider the effects produced by exposure of the vaccinated to the variolous contagion, I may notice that 53 correspondents represented the small-pox to have *entirely* ceased in their neighbourhood at the time they wrote, and 27 observed that it still continued more or less to prevail.

Having no hypothesis to support in framing my queries about the safety of the vaccinated, I simply asked of each practitioner whom I addressed— 1. “Have you met with small-pox *in any form*, after vaccination which *you deemed to be perfect?*”— 2. “Have any *died* of small-pox who were ^{ed.} *supposed to have been properly vaccinated?*” The replies which I have received to the former query, contain a considerable body of information, which shall be subsequently given; in answer to the latter query, 5 correspondents stated that they had neither seen nor heard of any one dying from small-pox who was supposed to have been properly vaccinated, 3 affirmed that such an event had not taken place in

Effects of the
variolous con-
tagion upon
the vaccinat-

Deaths from
small-pox
after vaccina-
tion.

their neighbourhood, 1 stated none that he had seen had died under such circumstances, and 78 briefly replied that “none” had happened. The enemies of vaccination, and those who are indifferent about it, have reported to me no deaths under this head; and all that the friends and great promoters of vaccination have been so candid as to communicate amount to these: 1. *Mr. Manby* of *Rudham* stated, that he knew the son of a neighbour of his, vaccinated 16 years ago, who died of small-pox within the last year or two near London; 2. *Mr. Primrose* of *Wrentham* in *Suffolk*, attended an adult female during small-pox * which ended fatally, in the beginning of January 1820, and the patient had been formerly vaccinated by an old woman; 3. *Mr. Utting* of *Long Stratton* had been told of a patient, vaccinated by him many years ago, having died of small-pox in the Norwich workhouse in 1819, but on inquiry I found that no such an occurrence took place there; 4. *Mr. Jollye* of *Loddon* informed me of one child having died of the small-pox under his care in 1819, which was vaccinated some years before by a surgeon whose name he could not ascertain, (at the same time that others in the family were vaccinated,) and had a scar on each arm; 5. a correspondent informed me that a surgeon, residing in the same village with himself, met with a fatal case of small-pox in January 1820, in a girl whom he believed he had effectually vaccinated seven years before; 6. *Mr. Crowfoot* of *Beccles*, (in reply to a second application of mine, which I made in consequence of the report having reached me,) stated in the latter end of January, that two young women in the same family died of small-pox, a few weeks before, whose parents supposed them to have been secured

**Mr. Primrose* says “I think it may not be amiss to remark, that the mother of the above patient had the small-pox from nursing her daughter”.

by vaccination ; but on inquiry "it was ascertained, that they had been vaccinated by an old woman, and that the matter had been taken at a very advanced stage of the disease"*.

If we consider that the above accounts of fatal small-pox after cow-pox were obtained by a direct query, to which no correspondents failed to reply ; that they refer to *reports* of the kind, and are not limited to the experience of the individual who writes ; that above two-thirds of all the medical men within a district comprising not less than 350,000 inhabitants communicated to me their opinions ; and that, after the end of the year 1819, I continued my researches in every quarter where I heard of reported failures, up to the time when I arranged this sheet (May, 1820), it is scarcely assuming too much to state, that it is probable this contains nearly every fatal case of small-pox which occurred, during the epidemic in the country around Norwich, in persons believed to have been vaccinated. The number is reduced to *one* who was attended during the fatal disease, by the surgeon who vaccinated him, *another* vaccinated by an unknown medical man, and *three* by old women ; and compared with the numbers vaccinated, and the great proportion of these which must, within the last year and half, have been exposed to the small-pox, we may regard it as a triumphant proof of the fatal effects of the latter disease being generally prevented by the cow-pox.

In speaking of the effects of the variolous contagion in producing eruptive diseases in the vaccinated, which did not prove fatal, I find it convenient to notice : *first*, exposure to the contagion immediately previous to, or during the vaccine disease ; *secondly*, the safety of those vaccinated in 1819,

Mr. Croufoot adds : "the patients were sisters, and their mother, who was much marked by previous small-pox, has, I am told, again had the disease, but I have not been able to obtain a history of her case".

and exposed to small-pox after the vaccine disease was completed; and *thirdly*, the state of those who were exposed to the variolous contagion, after having been vaccinated at a more remote period.

Exposure to
the small-pox
during the
vaccine dis-
ease.

Numerous correspondents have informed me of their vaccinating children in the same house with small-pox and preventing their taking it, although they were in the same room or bed as the variolous patient during the progress of the vaccine disease. After two had fallen down with the small-pox, *Mr. Rose of Eye* waited four or five days before he obtained lymph, with which he successfully vaccinated several in the same family and prevented small-pox. *Mr. Butter of Kenninghall* has, in four families, waited six or seven days, and then vaccinated those, who had not already sickened for the small-pox, and saved them from having it. But occasionally when the vaccination took place under these circumstances, a mild variolous eruption has accompanied the progress of the cow-pox. *Mr. Wallace of Lytcham* found small-pox appearing on the sixth day of vaccination, which proved mild and without secondary fever. *Mr. Lock of Debenham* vaccinated several in a family some days after small-pox appeared, and they had a *diminutive* small-pox with the cow-pox. Two instances of small-pox, appearing under these circumstances, have been reported to me, in reply to my query as to the disease having occurred in any form in the vaccinated. In a family where one child was labouring under confluent small-pox, another was vaccinated and appeared to go perfectly through the cow-pox; but when the surgeon believed the vaccine disease completed, before the scab had fallen off, this child sickened, and had a plentiful crop of distinct variolous pustules, attended with little fever; with matter taken from this eruption, a child was inoculated and died with the confluent disease. In the other example, a child, living in a family where one had already died of natural small-pox, was

effectually vaccinated, and ichor was taken from its arm at a proper time, and three days afterwards it came out with the small-pox : the child did well, but the reporter, who is adverse to vaccination, relates it as a failure, and states, that from the variolous eruption he took matter, with which he inoculated several others.

Of the many thousands who were vaccinated in 1819, and who went through the cow-pox completely, without any variolous eruption appearing, not one has been stated by my correspondents to have been since affected in any degree by the variolous contagion, although a majority have mentioned that they were afterwards exposed to it in all possible ways, and many inoculated with variolous matter. In this respect, therefore, the cow-pox has exerted all the preservative powers which were ever attributed to it by its warmest advocates.

Those who were vaccinated before the year of the epidemic have been subjected to inoculation in many instances, as well as exposed to the variolous contagion ; and I have next to describe what has been communicated to me upon each of these heads.

Seven correspondents speak of having inserted variolous matter into the arms of persons vaccinated from one or two to 15 or 20 years, without effect, or without producing more than a local pustule, unattended by any general eruption. The only instances particularly described to me, in which any general eruption arose from this experiment are the following :

1. One surgeon, two years ago, produced 100 variolous pustules in a child who had been vaccinated four or five years before—2. Another caused a few pustules, which died away in 5 days—3. A child, vaccinated several years, had a variolous eruption, from inoculation, leaving a few scars upon the face. All these occurred before 1819—4. Amongst a great number inoculated this year after vaccination, a fourth surgeon enumerates two cases in which an imperfect eruption

Effects of variolous inoculation upon those vaccinated before the epidemic of 1819.

took place, becoming pustular and turning on the fifth or sixth day. In one of these, only eight pustules were produced; the vaccination had been performed 8 or 10 years. Some examples are also noticed, where professed inoculators have produced imperfect eruptions in the vaccinated, a few of which will be subsequently alluded to.

Amongst my correspondents, 44 state that they have never seen small-pox in any form after vaccination; 8, that they have never met with it after vaccination which they had pronounced to be complete; and 3 that they have seen no such cases, but have known varicella mistaken for the small-pox. One of these gentlemen calls it "varicella proceeding from the variolous contagion". Of these 55 surgeons, many mention persons, vaccinated from six to fourteen or eighteen years, being exposed to small-pox, under their inspection, without the least injury.

Proportion
of medical
men who
have met
with small-
pox after
vaccination.

Amongst those correspondents who mention that they have seen examples in which the vaccinated did not perfectly resist the variolous contagion, 2 state that they saw mild cases of small-pox formerly after vaccination, but none in 1819; and 33 mention having witnessed the like, but without limiting their experience to any particular period. Five correspondents mention having seen 1 mild case of small-pox after vaccination; eight mention 2 cases of the same character; four have seen 3 cases, in one of which there were 100 pustules; two specify 5 cases, all mild; two have witnessed 6 cases; one has seen 10 cases; one no less than 16, the mildest of which he could not regard as varicella, because they arose from the variolous contagion, and the vaccinated only were affected, those who formerly had small-pox escaping; three allude to some mild and modified cases; six represent several cases to have occurred to them at different times, and one has seen great numbers affected with natural as well as inoculated small-pox, after being pronounced safe by medical men, but in no one ending fatally.

In these instances the variolous eruption has rarely been regular, being designated as *small-pox disarmed, diminished, mitigated or modified*; the pocks few in number, and incrustation happening on the 5th or 6th day, without secondary fever. Six of these correspondents have, however, stated that they have seen the disease taking the course of regular small-pox; three mention having seen a case or two that proved severe, and two state cases under their care were considered dangerous. In general no particulars are afforded of the previous vaccination, except that it was deemed to have been sufficient; but a few represent these occurrences to have taken place, in those, whom they themselves vaccinated and attended during the progress of the cow-pox. In a severe case which *Mr. Fulcher* of *Hingham* met with, the patient had been vaccinated 20 years before, and stated ichor to have been taken from a single vesicle to vaccinate others with. *Mr. Barber of Hindolvestone* represented the pocks, in two cases which he met with, to have been surrounded by a red circle; they had been formerly vaccinated by himself.

The interval which elapsed between the vaccination and the occurrence of the variolous eruptions has commonly not been mentioned by my correspondents. The shortest interval specified is stated by a surgeon who vaccinated an infant three days old, and watched the cow-pox through its regular progress, (during which the child was carried into a house where the small-pox was prevailing,) but three years afterwards it had the latter disease, which left scars, and furnished matter for inoculating many others. The interval mentioned by 8 other surgeons is not less than five years, varying from that number to twenty.

The mildness of many of these eruptions which are reported as small-pox after vaccination, has been the frequent cause of dispute as to their nature, and the term that ought to be applied to them. In regard to their frequency, I have been

Characters of
the small-pox
after vaccina-
tion.

Periods at
which small-
pox has oc-
curred after
vaccination.

Proportion of
vaccinated
affected by
exposure to
the variolous
contagion.

favoured with few opinions ; *Mr. Wales* of *Downham* believes that 1 in 80 or 100 of those exposed to the variolous contagion will be in some degree affected by it, but not one in a 1000 of these will have the variolous eruption in a severe form. There is ground to believe, from what I have been informed of, *that not a very considerable proportion* will be affected, either mildly or severely, by such exposure. At *Lynn*, where I have already described the small-pox to have been extremely fatal, and consequently the exposure of the vaccinated general, very few examples, even of the modified disease, and only one of small-pox approaching to regular, in the vaccinated, have been communicated to me ; yet, had serious failures taken place “ the town destroyed by fire”, as one correspondent emphatically expresses himself, “ would as soon have remained a secret ”*. At the Dispensary, 35 variolous patients were recommended during the summer of 1819, and 10 of them died ; yet only three vaccinated children are mentioned as having been received there as patients on account of a varioloid eruption. In all these the disease was regarded at first as varicella, but *Dr. Whiting*, who is at present one of the physicians to the Dispensary, found

* From this town *Dr. Redfearn*, *Dr. Whiting*, *Mr. Fulcher*, *Mr. Bayes*, and *Mr. Chadwick* obliged me with direct communications, and four other surgeons stated they had met with nothing of importance enough to be related. It is therefore upon the evidence of about two thirds of the practitioners in *Lynn*, that I state serious failures not to have happened during the recent prevalence of small-pox. *Mr. Fulcher*, who, until very lately, held the appointment of surgeon to the Dispensary, says, that for four years past, (during the first and last of which the small-pox was very general in *Lynn*,) no case of the disease, occurring amongst the vaccinated in any degree of severity, has come even within his hearing, and it is from this gentleman, who has bestowed so much attention upon the subject of my inquiries, that I have quoted the above animated expressions

reason to regard them, on more minute examination, as modified small-pox. Eruptions of this kind, he observes, occurred only during the prevalence of small-pox, and he is convinced that similar eruptions are occasionally produced by the insertion of variolous matter into the arms of those who have had the cow-pox. The eruption is not uniform in its appearance in different patients, nor even in the same subject, being met with in all the intermediate degrees, from a red elevation of the skin to a well formed pustule; some conical, others having the peculiar depression in the centre, so characteristic of small-pox; some changing before the formation of pus, and producing a crust; others maturing and leaving a pit. „I am quite certain”, continues *Dr. Whiting*, “that if such eruptions are to be placed under the head of *varicella*, this disease does not require any specific contagion to give it birth; and it has struck me as remarkable, as I think it must have done other medical men, that we seldom hear of chicken-pox, except during the prevalence of small-pox”.

Mr. Aldham of North Walsham has related the particulars of an eruption, considered to be varicella on account of its short duration and its irregular character, yet which produced the small-pox in others of the same family. The patient was a maid-servant, vaccinated nearly 20 years ago, and having a scar on each arm; she went into a parish some miles distant, where the small-pox was prevailing, and 14 days afterwards she was seized with severe feverish symptoms, on the second day of which, the eruption came out, and declined on the sixth day, without secondary fever. The small-pox at this time was not in the town, and a maid-servant, in the same family, who had not been out of the house, and had never had cow-pox nor small-pox, sickened at the end of three weeks and went severely through the latter disease, many of the pocks not incrusting before the 12th day. Two young ladies in the same family, formerly vaccinated, had,

Effects of the
contagion of
varioloid
eruption.

about the same time, a mild eruption turning on the 5th or 6th day, yet the parents knew these young ladies to have had the chicken-pox four years before, by having kept a register of all the diseases which their children suffered.

The mildness of the small-pox after vaccination, as some of my correspondents have remarked to me, induced them to regard it as varicella, *until* they found it proceeding from the variolous contagion, and apparently giving rise to regular small-pox in those not protected against it.

Opinions in favor of their being more severe at a remote period after vaccination.

The extensive experience which *Mr. Crowfoot of Beccles* has lately had, in observing varioloid diseases in the vaccinated, during the prevalence of small-pox in that neighbourhood, up to the present time, has induced him to favour me with repeated communications, in the last of which he remarks : "the principal facts which I have observed are, that a large proportion of those, who had been vaccinated above six or seven years, after exposure to the variolous contagion, suffered from an eruptive disease, attended with smart fever at the beginning, always at first papular, generally becoming vesicular, and not unfrequently pustular; but, with the exception of two instances, always turning on or before the 6th day of the eruption, and in no instance proving fatal. Ichor, taken from the vesicles, has produced, by inoculation, pure small-pox in those who had not previously had either this disease or the cow-pox. About 400 were vaccinated in this place last summer, but I do not hear that one of these has since had this modified small-pox, nor have I succeeded in giving it to a single patient, who had not been vaccinated six or seven years."

The opinion that the modified eruption is apt to be more severe in proportion to the distance from vaccination, is supported by a gentleman of equal experience. *Mr. Borrett of Yarmouth*, after enumerating several instances of the disease, at intervals of from 3 to 20 years, some of which were severe.

and approached to regular small-pox, observes, "the cases which I have seen at the distance of four, five, or six years, have been less violent, wholly unlike chicken-pox, and not very like small-pox, unless attentively examined, when some pocks will be found to have the indentation in the centre so peculiar to small-pox, and which also marks this modified disease, which ought to have an appropriate name".

Mr. Borrett states that in one young lady in whom this modified eruption occurred, variolous inoculation had been practised subsequent to vaccination, producing a sore upon the arm without any general eruption. *Mr. Costerton of Yarmouth* mentions a similar case, the modified small-pox, which was mild, having appeared in a patient inoculated twice or thrice with variolous matter a short time after the vaccination.

It appears that re-vaccination will not in every case prevent the variolous contagion from producing some degree of effect at a remote period, any more than inoculation. *Mr. Chapman*, an industrious student of medicine, has communicated to me his own case, which applies to this question. He was vaccinated when two years old, and *Mr. Dashwood of Beccles* has informed me that his two sisters were vaccinated from him, and that three well marked vestiges of the cow-pox remain upon his arms. In the summer of 1819, he re-vaccinated himself, the incisions inflaming slightly, and disappearing in three or four days. He continued, for a short time after this, to attend variculous patients in Norfolk, but soon went to London to resume his studies. A week after his arrival in London, and a fortnight from his having visited any variolous patient, *Mr. Chapman*, (in describing his own case,) says that he was attacked with severe febrile symptoms, which continued for three days, when a eruption began to appear on the forehead and wrists. On the second day of the eruption, the pimples were changed into vesicles, and the febrile

Inoculation
and re-vacci-
nation will
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instance make
sure of the
varioloid
eruptions not
occurring on
exposure to
small-pox.

symptoms much abated. Fresh pimplies came out on the nose and eye-lids on the third day; at this time there were not above five or six vesicles on the lower extremities. On the 4th, the pocks hard, horny and resisting; pulse 100. On the 5th day, there was considerable inflammation around the base of the vesicles, and the forehead and eye-lids were swollen; pulse 120, and in the evening 130. On the 6th day, some pocks pustular on the forehead, and the pulse in the afternoon 90; appetite good, and itching, of which he had much complained, diminished. In the course of 7th day, the pulse varied from 130 to 85; pocks firm, and requiring considerable force to rupture them. On the 8th day, the inflammation had diminished and a few of the pocks began to incrust on the forehead; general health good. The following day, the scabbing was mostly completed and all swelling subsided. In three days more, the scabs had fallen off from the neck, breast and arms; from the other parts they separated slowly, and were not all detached until near the end of three weeks.

Irregular effects of inoculation from these eruptions.

Inoculation from the modified disease will not always produce small-pox in those not protected against it. A child vaccinated above three years before, and having only a single pustule, from which 25 others were vaccinated, was inoculated with variolous matter, in the summer of 1819, and had a spurious and incomplete eruption. From this eruption, *Mr. Williams* of *Reepham* informs me, that an old woman inoculated several others, who had not had either small-pox or cow-pox, and she believed them to have a remarkably favourable sort of the former disease; but within a few weeks, several of them took the regular small-pox, and some of them died of it. Yet the matter, with which the vaccinated patient was inoculated, was proved to be truly variolous, because another in the family, unvaccinated, was inoculated at the same time, and had a regular and severe disease; from the eruption in the latter child, *Mr. Williams* himself took matter,

and inoculated effectually nearly a hundred in an adjoining parish, out of which number one died.

This is not the only instance of the kind reported to me. *Mr. Manby* of *Rudham* says that above two years ago he carefully investigated some cases which occurred 15 miles from his residence, and which had been hastily pronounced on the first day of the eruption to be variola, but which he could in no way discover to be different from that degree of varicella, seen by him both before and since, in those who had gone through the *variolous* disease; yet a practitioner inoculated persons from pustules of the above cases, producing appearances regarded as mild variola, and in two or three instances, these subjects had afterwards perfect natural small-pox.

The causes to which the reputed or real failures of the cow-pox to protect perfectly against the variolous contagion are to be attributed, was the subject of one of my queries; and to this point 42 of my correspondents have answered, the rest declining to give an opinion, from not having had sufficient experience of the subject, or not having maturely considered it.

To represent briefly and clearly the numerous causes assigned for small-pox occurring, in some form, in those supposed to have had the cow-pox, I must arrange them as they regard—1. the source of the lymph employed—2. the condition of the subject to be vaccinated—3. the appearance and progress of the vaccine disease—4. the duties of the vaccinator—and 5. the real efficacy of the cow-pox to afford protection, where it has gone through its regular course.

Reasons
assigned for
the cow-pox
not always
protecting
perfectly
from the
small-pox.

First. The vaccine ichor is stated to be a cause of failure, from—its being obtained from a spurious, injured or irregular pustule; its being taken too late, after the areola has declined, or two early, before it has begun to form; the ichor being procured from a subject labouring under some other disease; the ichor being used, which was rapidly secreted

after a pock had been broken up, and too much taken away; its being kept too long, or changed by the rust of a lancet.

Secondly. Failure of cow-pox, from the state of the subject vaccinated, is represented to arise from the system being occupied by serofula, or other diseases, at the time; or from the skin being in an unhealthful state, and affected with eruptions.

Thirdly. The progress of the disease induced by the vaccination, may furnish as causes of failure—a spurious, premature and irregular pustule; a pustule dying away in a few days; the regular vaccine vesicle being too much injured, either accidentally, or for the purpose of obtaining ichor; all the vesicles being opened; one vesicle only being produced, and that broken up; the areola being absent or insufficient; the local disease not producing any constitutional effect; the supervening of other diseases during the progress of the vaccine.

Fourthly. Supposed failures, as they regard the operator, may arise from—his inexperience or inattention; his employing improper ichor; his not distinguishing between the true and spurious disease; his not watching the progress of the disease, and allowing the spurious, injured, imperfect or irregular pustule to pass for the good; his not ascertaining that the local disease produces a constitutional effect.

Fifthly. Where the vaccine disease has been perfect, and all the foregoing sources of error avoided, failures may still occur, owing—to peculiarity of constitution in individuals or families, as some resist small-pox and others have it more than once; to a susceptibility in certain constitutions to secondary eruptive fevers; to the lymphatic vessels, after a time, regaining their power to be acted upon by the variolous contagion; to the prophylactic power of cow-pox being diminished by time; to the cow-pox being able to afford perfect

protection for an indefinite time, but not permanently; to a real defect of the cow-pox to produce security in many constitutions.

Several of these causes of failure being often enumerated by the same correspondent, I am unable to give a general account of the precise numbers, who favour any particular opinion; and I can only remark that— 10 refer failures to imperfect vaccination; 8 attribute them entirely to the inexperience or oversight of the operator, who is often not a medical man; 6 mention time as diminishing the security afforded by the cow-pox on exposure to the variolous contagion, the complete prophylactic power being only temporary; and 5 believe that, where varioloid eruptions occur after regular cow-pox, it is to be regarded as owing to idiosyncracy of constitution, as some persons have small-pox twice.

In illustration of these different causes of real or supposed failures of the cow-pox, many correspondents relate particular cases, some of which are so generally admitted that it is not needful to repeat them; a very few will therefore be selected, in addition to what has been already referred to, in speaking of the varioloid eruptions in the vaccinated.

Dr. Girdlestone refers to instances where several were vaccinated with ichor, obtained from the same source, and all had regular cow-pox except one, in whom the disease took a short irregular course; and at a subsequent period, a repetition of the operation produced in this child a perfect vaccine vesicle. *Mr. Utting* of *Long Stratton* thinks that 99 failures out of a hundred are produced by employing ichor taken at too late a period or kept too long. *Mr. Harris* of *Botesdale*, has observed irregular and unsatisfactory vesicles produced by ichor kept for a fortnight, and taken later than the 10th day, and he has not succeeded in producing a satisfactory vesicle by employing the most fresh and active lymph soon afterwards; but, by waiting a few

weeks, he has obtained a perfect form of the vaccine disease on repeating the vaccination.

Mr. Cooper of Martham, who conducts vaccination in a most careful manner, and keeps a register of every case, vaccinated 800 in the summer of 1819. Many of these he believes to have had the vaccine disease imperfectly. In one village, the scarlet fever broke out a day or two afterwards, and attacked nearly twenty of those just vaccinated; the vaccine punctures inflamed prematurely, some of them to an alarming degree, and as the cow-pox assumed such irregular and unusual appearances, he thought none of them safe from a subsequent attack of small-pox; yet he could not prevail upon any of them to be re-vaccinated.

Present practice and estimation of vaccination.

Having deferred this abbreviation of a correspondence which has been so gratifying to me, to the last moment which the press allowed, that I might take advantage of the latest communications, I shall conclude with the general result of replies to my last query: "does vaccination continue to be generally practised?". In answer to this, 69 gentlemen state vaccination to be generally practised in their respective districts; 3 affirm it to be more practised than ever, in consequence of the recent opportunities of seeing the casual and inoculated small-pox; 2 think it gains ground; 3 regard it with diminished confidence from recent failures; 5 find great prejudices are entertained against it; 1 says it is seldom practised amongst the poor; 1 that it is not much in vogue; and 1 that it is *almost entirely* out of fashion.

In thus endeavouring to compress into a small compass the result of my inquiries, I have omitted to quote the particular statements of a great majority of my correspondents; I have however employed them all, and am equally obliged to every individual. To bring together the varying opinions of a great number of practitioners in the same neighbourhood is a task of some delicacy as well as difficulty; but I am not conscious

of having suppressed any thing which it was important to communicate, nor of having related any thing which it would have been better to withhold. What this man teaches, or that man writes, is often of less consequence to the public, than the opinions and practice of a great body of medical men, actively engaged in the exercise of their profession. To this we must attribute any value that may be attached to a document, comprising a view of the different opinions entertained respecting the cow-pox, and the estimation in which it is at present held, by about two-thirds of the medical practitioners, in a populous district not very remote from the metropolis.

APPENDIX, No. III.

Containing an Abstract of the "Report of Vaccinations practised in France during the year 1816."

Measures to promote vaccination in France.

HAVING stated that in France, few legislative measures have been enacted to extend vaccination, I cannot avoid noticing the encouragements held out to those who zealously promote it. Prizes are annually distributed to those surgeons who have vaccinated the greatest number, and the préfets of the different departments have been requested to subdue, by every means in their power, the prejudices against the practice. Although these measures have been inadequate to effect universal vaccination, they have in *some districts* made it very general, and the want of attention to them in *others*, has occasioned the small-pox to gain ground and cause a considerable mortality.

The ferment created by great political changes had not sufficiently subsided in 1815, to allow much attention to be bestowed on vaccination; but in the following year, the importance of keeping up the practice was felt, and fresh exertions made, by magistrates, clergy, and private individuals, to support and extend it. The numbers of the vaccinated, as reported from the different departments, during these two years, is thus stated :

Depart- ments.	Births.	Vaccina- tions.	Small- pox.	Dis- tinguished.	Deaths.
In 1815..	76	653,444	263,389	37,630	produced
In 1816..	71	604,935	431,648	24,610	2,482

To shew the effects which this great increase of the number

vaccinated during the latter year produced upon the mortality of the small-pox, and to fix the attention of the public to the means by which so beneficial a purpose was chiefly accomplished, is the avowed object of the central vaccine committee of Paris in publishing the report which I have before me *. The steps taken in some instances by the local authorities, and by the heads of the clergy, have appeared to me worthy of a short notice.

Many prefects of the different departments adopted only persuasive measures; but some inflicted severe privations upon those who were attacked with, or remained liable to the small-pox. In two departments, the prefects admitted none into the public schools, who had not had small-pox or cow-pox; excluded from sharing the benefits of public charities or donations, all parents who refused to have their children vaccinated; and issued no indentures of apprenticeship for, nor gave employment in the public works and establishments to, any individuals who remained liable to small-pox. These efforts were further assisted by a recommendation to masters of families, shops and manufactories, not to receive any workman, servant, or apprentice, who could not certify that he had either had the small-pox, or been vaccinated.

One prefect ordered that children falling down with small-pox, whom their parents had refused to get vaccinated, should be secluded during the whole of the disease, and in case of neglect of this order, be transferred to the nearest hospital, to be supported there, until their recovery, at the expense of their parents. Another prefect required, that when the small-pox appeared, notice should be given of it to the mayor of the town, who was to prevent the spreading of

Number vac-
cinated in
1816.

Measures di-
rected by pre-
fects of de-
partments.

* Rapport du Comité Central de Vaccine sur les vaccinations pratiquées en France pendant l'année 1816.

the contagion by placing a notice over the infected house, keeping the variolous subjects within the walls of their proper dwellings, and hindering all communication from without.

At Nantes, the disease having shewed itself in families who had neglected vaccination, strict orders were given for individuals not to appear in the public streets or walks, whilst the variolous scabs were yet upon them. The mayor of *Amiens* proclaimed that those parents who, through culpable neglect, left their children exposed to the ravages of the small-pox, would be refused that pecuniary relief of which they had rendered themselves unworthy. Those who neglected their own safety were not the only persons punished; for it is stated that the mayors of two towns were dismissed from their employments, the one for having neglected to give notice of the introduction of small-pox, and not meeting the requests of parents who applied for means to have their children vaccinated; the other, for refusing to attend to the direction of the sub-prefect of the department, and shewing the greatest indifference about the propagation of the cow-pox.

The clergy in many instances lent their assistance to vaccination, and some bishops are stated to have addressed those within their diocese, requesting them to read an exhortation in their churches at the season of each year when the public vaccinating ought to commence. In the districts where these measures were undertaken, the results exceeded what had at any previous time been met with, the number vaccinated during the season, amounting, in some districts, to twice the number of births, so as to limit the small-pox to a few solitary cases, or prevent it altogether; and the restraint put upon those labouring under the disease, and the precautions taken to prevent its spreading, roused the less enlightened part of the inhabitants to consider it in its true light, as a destructive plague, which they ought always to fly from and to avoid.

Measures pursued by mayors of towns.

Measures adopted by the clergy.

In addition to these details of the measures to promote vaccination, and prevent the spreading of the small-pox, this report contains some medical observations upon the influence of the cow-pox upon other diseases. One surgeon cured obstinate ulcers upon the arms and chest, by touching their surfaces with the vaccine ichor; after which they became covered with a white film, suppurated and healed. Another cured a glandular tumor situated upon the shoulder, by vaccinating the child, making six punctures upon the tumor, and three upon each arm: the tumor suppurated and the wound cicatrized. A child having several glandular tumors of the neck, a surgeon inserted vaccine ichor by ten different punctures in these situations, producing as many vesicles, and during the progress of these, the swellings upon which they were situated subsided. Another surgeon succeeded in curing a white swelling of the knee, which had existed for eighteen months, by producing twelve vaccine pocks upon the surface of the joint. Several children living in a very moist situation, had a considerable enlargement of the spleen; a surgeon vaccinated them by 30 or 40 punctures in different parts of the body; fever was excited, lasting from five to eight days, and when the vaccine disease was completed, a remarkable diminution was found to have taken place in the spleen. A case of severe rheumatic pain in the shoulder, which, in a girl twelve years old, had resisted various remedies, was removed by vaccinating her by several punctures in the skin covering the deltoid muscle. A disease of the spine is also reported to have been cured by making twenty vaccine punctures in the skin covering the dorsal and lumbar vertebrae, and producing as many regular pustules, which suppurated for a long time.

In the writings of foreign authors, I have met with experiments of a similar kind, showing that the vaccine vesicles acting as a blister or seton, or the fever excited by them

Effects of the
cow-pox in
curing other
diseases.

proving a stimulus to torpid and inactive parts, may occasionally cure diseases; but I have not entered into the subject, doubting if such researches do not retard the fulfilment of the great object of vaccination, *the prevention and extermination of the small-pox.*

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